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JOURNAL OF THE MALAYAN BRANCH
ROYAL ASIATIC SOCIETY.



(133)



JOURNAL

of the

Malayan Branch

of the

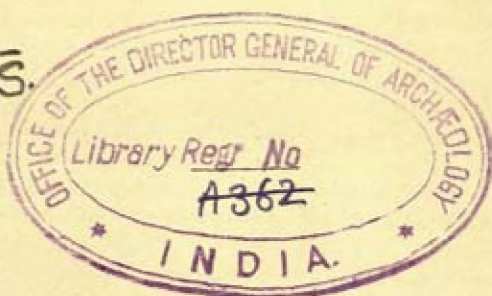
Royal Asiatic Society

25070

Vol. VI

1928.

891.05
J.M.B.R.A.S.



This Journal forms the continuation of the Journal of the Straits Branch, Royal Asiatic Society, of which Nos. 1-86 were published 1878-1922.

SINGAPORE
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1928.

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Vol. VI.

Part I

Journal

of the

Malayan Branch

of the

Royal Asiatic Society

March 1928

SINGAPORE

PRINTED AT THE MALAYA PUBLISHING HOUSE, LTD.

1928

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The Malayan Branch

of the
Royal Asiatic Society

Patron.

H. E. SIR HUGH CLIFFORD, M.C.S., G.C.M.G., G.B.E.,
*Governor of the Straits Settlements, High Commissioner for the
Malay States, British Agent for Sarawak and North Borneo.*

Council for 1928.

SIR HAYES MARRIOTT, K.B.E., C.M.G.	..	<i>President.</i>
THE HON. MR. R. O. WINSTEDT, C.M.G.	}	<i>Vice-Presidents for the S. S.</i>
D. LITT.		
MR. C. E. WURTZBURG, M. C.		
MR. J. B. SCRIVENOR	}	<i>Vice-Presidents for the F. M. S.</i>
MR. A. W. HAMILTON		
MR. R. E. HOLTUM		<i>Hon. Treasurer.</i>
MR. NORMAN SMEDLEY		<i>Asst. Hon. Secretary.</i>
MR. F. N. CHASEN		<i>Hon. Secretary.</i>
MESSRS. C. BODEN KLOSS, J. D. HALL, W. G. STIRLING, CAPT. A. C. BAKER, M.C., and M. R. HENDERSON	} <i>Councillors.</i>	

Proceedings
of the
Annual General Meeting.

The Annual General Meeting was held in the Society's Room in the Raffles Museum, Singapore at 4.30 p.m. on Monday 20th February 1928.

The Hon. Mr. R. O. Winstedt M.C.S., C.M.G., D. LITT. in the chair.

1. The Minutes of the Annual General Meeting held 25th February 1927 were read and confirmed.
2. The Annual Report and Statement of Accounts for 1927 were adopted.
3. The Officers and Council for the current year were elected. (ante p. iii).
4. The following alterations to the Rules were made:—

(a) Rule 5 was amended by deleting the third and last paragraph and substituting the following:—

“Newly elected members shall be allowed to compound for life-membership for \$100; other members may compound by paying \$50, or \$100 less the amount already paid by them as ordinary members in annual subscriptions, whichever of these two sums is the greater.

(b) Rule 8 was amended by the insertion of the words “An Assistant Honorary Secretary” after “An Honorary Secretary.”

Annual Report.

of the

Malayan Branch, Royal Asiatic Society

for 1928.

Membership. The close of the year saw 660 names on the membership roll of the Society as compared with 662 at the end of 1926.

There were 17 Honorary Members, 3 Corresponding Members and 640 Ordinary Members.

The Council regrets to record the death of two of the oldest members of the Society: Dr. Van Beuningen van Helsdingen was elected in 1887 and acted as Hon. Librarian to the Society on several occasions; Mr. W. L. Conlay, C.B.E. was elected in 1897.

Two new Honorary Members were elected during the year, Sir W. G. Maxwell, K.B.E., C.M.G., and Mr. H. C. Robinson, both these gentlemen having rendered notable service to the Society in the past.

Fifty-six new members were elected during the year but it will be noticed that although resignations are few (8) the membership is no greater than in the previous year. This is due to the rigid application of Rule 6 and at the close of the year no member was retained on the Membership roll whose subscription for 1926 remained unpaid.

The new members are:—

Abdul Ghani bin Mohamed	Herrod, H. J.
Agama, J.	Jamieson, M.
Ahlston, A. T.	King, S. E.
Allen, B.W.	Keble, W. T.
Alor Star Govt. English School	Laycock, J.
Union.	Leddin, N.
Best, G.A.	Leyh, S. G. H.
Boyd, T. R.	Maaloe, C.
Carroll, A. F.	Malleson, B. K.
Cooper, C. B.	Marshall, A. O.
Clark, B. F.	Megat Yunus bin Isa
Cumming, C. E.	Mohamed Noor bin Mohamed
Davies, E. R.	Natividad, P.
Dawson, C. W.	Nisbet, W.
Dodd, G. C.	Osman bin Talib
Education Dept., Kedah	Partridge, A. T.
Farrelly, G. A.	Pitt, I.
German, R. L.	Redhead, N. R. F.
Graham, H. Gordon	Sheffield, W. D.
Hall, A. S.	Simpson-Gray, L. C.

Staines, E. A.	Vethavanam, J. R.
Strugnell, E. J.	Watson, E. L.
Sungai Pétani Govt. Free School	White, Rev. Graham
Tallack, C. C.	Williamson, K. B.
Thayer, K. V.	Wood, D. D.
Thillaimuthu, S.	Woolley, J. B.
Thomson, G. M.	Young, C. G.
Toyo Bunko, The Tokyo	Zumstein, R. B.
Turner, R. A.	

Council. For part of the year the President (the Hon. Mr. R. O. Winstedt, C.M.G. D. Litt.) and both Vice-Presidents (Messrs. A. W. Hamilton and C. E. Wurtzburg) were away from Singapore and Mr. C. Boden Kloss was therefore elected a Vice-President on June 1st. The vacancy thus caused on the Council was not filled.

Annual Meeting. The Annual General Meeting was held in the Raffles Museum, Singapore on February 25th.

Journal. Three journals were printed during the year and formed Vol. v, which consisted of XXXIII and 591 pages, 1 map, 1 geological map, 2 plates and 2 text-figures.

Part I was entirely devoted to a translation of an old Dutch document belonging to the library of the India Office, London. The interest and historical value of this document, which is an official report of a Governor of Malacca at the end of the seventeenth century, are exceptional. Part 2 was a miscellaneous number and contained articles on Botany, Zoology, Geology and Local Customs as well as contributions of less specialized interest: part 3 which was published with the financial assistance of the Kedah Government and the Committee for Malay Studies contained the tale of Trong Pipit as related by Panglima Mudin bin Panglima Hassan of Perlis for Mr. J. C. Pasqual who kindly presented the MS. to the Society for publication.

Mr. C. E. Wurtzburg has made an index to all the journals of the Society from its foundation until its change of title to Malayan Branch, i.e., from numbers 1 to 86 (1878-1922).

The Council is especially appreciative of Mr. Wurtzburg's action and the thanks of all members should be due to him for undertaking this useful, but tedious piece of work.

The Index will be published in 1928.

Finances. Owing to the generous assistance of the Governments of the Straits Settlements and Federated Malay States the financial condition of the Society remains in a satisfactory condition and if the printers are able to deal with the additional work it is proposed to publish four journals in the current year.

Sales for the year include \$611.90 for Mr. L. A. Mill's "History of British Malaya, 1824-1867."

The Society has yet to be debited with an amount of from two to three thousand dollars in payment of the last two journals for the year, not yet brought to account.

The Hon. Treasurer suggests that out-station members should make a point of adding banker's commission on all cheques: this commission amounts to 5% of the individual member's yearly subscription.

It is to be regretted that members who do not pay their subscription when it is due are still numerous.

The Life Members' reserve, invested in S.S. War Loan (\$2,200) and S.S. and F.M.S. Victory Loan (\$2,500) remained unchanged and paid interest of \$245.

F. N. CHASEN,
Hon. Secretary.

MALAYAN BRANCH, ROYAL ASIATIC SOCIETY

Receipts and Payments for the year ending 31st December, 1927.

RECEIPTS.		PAYMENTS.	
Cash		Printing.	
Petty cash in hand, Jan. 1st, 1927.	2.29	Journal, Vol. 3 and 4, line blocks	39.00
Balance at Mercantile Bank, Jan. 1st, 1927.	7,766.38	" 4, pt. 3	876.20
		" 4, pt. 3 reprints	100.65
Subscriptions.		" 5, pt. 1	1,634.80
for the year 1927	2,474.30	Reprints	16.25
for previous years	390.00	Rules of Society, Circulars, etc.	143.87
for future years, in advance	293.37		
life memberships	400.00		
		Stationery (Hon. Secretary's Petties)	2,810.77
Grants.		Postage	26.91
S.S. Government, for the year 1927.	1,000.00	Salaries	86.33
F.M.S. Government	1,000.00	Sundries	338.00
			36.98
Interest.		Cash.	
on investment	245.00	Petty cash in hand, Dec. 31st, 1927	73.21
on current account	210.92	Balance at bank, do	11,536.29
			11,609.53*
Sales			
Maps	11.57		
Journals	1,104.69		
Dinner Accounts, 1926 (outstanding)	1,116.26		
	10.00		
	\$14,908.52		\$14,908.52

* Two Journals for the year are yet unpaid for, and a transfer of \$1,300 is required for the Life-Members' Reserve.

NORMAN SMEDLEY
Hon. Treasurer

List of Members for 1928

(as on 1st January, 1928.)

†Life Members.

Patron.

1927. CLIFFORD, H.E. SIR HUGH, M.C.S., G.C.M.G., G.B.E.

Honorary Members.

Year of Election.

- 1903.1923. ABBOTT, DR. W. L., North-east Maryland, U. S. A.
 1890.1918. BLAGDEN, DR. C. O., School of Oriental Studies, Finsbury Circus, London.
 1921. BRANDSTETTER, PROF. DR. R., Luzern, Switzerland.
 1894.1906. COLLYER, W. R., I. S. O., Hackford Hall, Reepham, Norfolk, England. (Council, 1904; Vice-President, 1897-1900, 1902, 1904-5).
 1903.1917. GALLOWAY, SIR D. J., Singapore. (Vice-President, 1906-7; President, 1908-13).
 1895.1920. HANITSCH, DR. R., 99, Woodstock Road, Oxford, England. (Council, 1897-1919; Hon. Treasurer, 1898-1906, 1910-11, 1914-19; Hon. Secretary, 1912-3).
 1922. JOHORE, H.H. THE SULTAN OF, G.C.M.G., K.B.E., Johore Bahru, Johore.
 1903.1927. MAXWELL, SIR W. G., K.B.E., C.M.G., 123, Oakwood Court, Kensington, W. 14, England. Council, 1905, 1915; Vice-President, 1911-2, 1916, 1918, 1920; President, 1919, 1922-3, 1925-6).
 1921. PERAK, H. H. THE SULTAN OF, K.C.M.G., K.C.V.O., Istana Negara, Bukit Chandan, Kuala Kangsar, Perak.
 1878. PERHAM, VEN. ARCHDEACON J., Chard, Somerset, England.
 1890.1912. RIDLEY, H. N., C.M.G., F.R.S., 7, Cumberland Road, Kew Gardens, Surrey, England. (Council, 1890-4, 1896-1911; Hon. Secretary, 1890-3, 1896-1911).
 1904.1927. ROBINSON, H. C., 142, Dukes House, St. James Court, London, S.W.1. (Vice-President, 1909, 1913, 1922-23; Council 1920).
 1916. SARAWAK, H. H. THE RAJAH OF, Kuching, Sarawak.
 1885. SATOW, SIR ERNEST M., Beaumont, Ottery St. Mary, Devon, England.
 1894.1921. SHELLABEAR, REV. DR. W. G., 20, Whitman Avenue, West Hartford, Conn., U.S.A. (Council, 1896-1901, 1904; Vice-President, 1913; President, 1914-18).

1921. SNOUCK-HURGRONJE, PROF. DR. C., Leiden, Holland.
 1921. VAN RONKEL, DR. P. H., Zoeterwoudsche Singel 44,
 Leiden, Holland.

Corresponding Members.

1920. LAIDLAW, DR. F. F., Eastfield, Uffculme, Devon,
 England.
 1920. MERRILL, DR. E. D., University of California,
 Berkeley, California, U.S.A.

Ordinary Members.

1926. AARSOE, E., Kretay Plantations, Kretay, Trengganu.
 1921. †ABDUL AZIZ, ENSKU, Johore Bahru, Johore.
 1926. ABDUL AZIZ BIN AHMAD, District Forest Office,
 Taiping, Perak.
 1927. ABDUL GHANI BIN MOHAMED, Medical College,
 Singapore.
 1926. ABDUL HAMID BIN DATO' KAYA, District Office, Klang,
 Selangor.
 1926. ABDUL HAMID BIN HUSSAIN, Pasir Mas, Kelantan.
 1918. ABDUL MAJID BIN HAJI ZAINUDDIN, Haji, Political
 Intelligence Bureau, Singapore.
 1926. ABDUL MALEK BIN MOHAMED YUSUF, Kuala Lipis,
 Pahang.
 1926. ABDUL MANAF BIN MOHAMED HASSAN, Monopolies
 and Customs Office, Alor Star, Kedah.
 1926. ABDUL RAHMAN BIN YASSIN, 3, Jalan Chat, Johore
 Bahru, Johore.
 1926. ABDUL RASHID BIN PILUS, Govt. English School, Alor
 Star, Kedah.
 1926. ABDUL RAZAK BIN HAJI ABDUL GHANI, Kampong
 Attap, Klang.
 1926. ABDULLAH BIN ABDUL-MULLALIB, HAJI, Treasury,
 Trengganu.
 1923. †ABDULLAH BIN JA'AFAR, DATO, C.B.E., Tarom, Johore
 Bahru, Johore.
 1916. ABRAHAM, H. C., Topographical Dept., Taiping,
 Perak.
 1907. †ADAMS, SIR A., K.B.E., Penang. (Vice-President 1919).
 1921. ADAMS, C. D., Simanggang, Sarawak.
 1920. ADAMS, P. M., Kuching, Sarawak.
 1917. ADAMS, R. H., Singapore.
 1909. †ADAMS, T. S., Kuala Kangsar, Perak.
 1919. †ADELBORG, F., Pelepah Valley Rubber Estates, Kota
 Tinggi, Johore.
 1927. AGAMA, J., Forestry Dept., Sandakan, British North
 Borneo.

1927. AHLSTON, A. T., Changkat Tin Dredging Ltd., Batu Gajah, Perak.
1925. AHMAD, H.H. TENGKU, Istana Marble, Johore Bahru, Johore.
1926. AHMAD BIN MOHAMED ISA, District Office, Sungai Patani, Kedah.
1926. AHMAD BIN OSMAN, Pekan, Pahang.
1926. AHMAD BIN YAHYA, 363, Serangoon Road, Singapore.
1921. AHMAD JALALUDDIN, Malay College, Kuala Kangsar, Perak.
1926. AHMAD ZAINALABIDIN, TENGKU, Kota Bharu Kelantan.
1922. ALEXANDER, C. S., c/o Crown Agents, 4 Millbank, London.
1924. ALEXANDER, J. A., 50, National Mutual Buildings, Smith Street, Durban, South Africa.
1927. ALLEN, B. W., Chief Police Office, Kuala Lipis, Pahang.
1914. ALLEN, H. C. W., Boustead & Co., Ltd., Singapore.
1921. ALLEN, L. A., Secretariat, Kuala Lumpur, Selangor.
1921. ALLEN, W. H. R., Straits Trading Co., Ltd., Penang.
1927. ALOR STAR GOVT. ENGLISH SCHOOL UNION, Alor Star, Kedah.
1926. AMBLER, G., Outram Road School, Singapore.
1926. ANDERSON, CAPT. H. A., Commissioner of Police, Kota Bharu, Kelantan.
1921. ANDREINI, CAPT. E. V., Kuching, Sarawak.
1926. ARIFF, DR. K. M., The New Dispensary, 217, Penang Road, Penang.
1926. ARIFFIN BIN MOHAMED YUSSOP, Govt. English School, Alor Star, Kedah.
1908. ARTHUR, J. S. W., Penang.
1926. ATKIN-BERRY, H. C., Swan & Maclaren, Singapore.
1926. AUGUSTINE, J. F., Govt. English School, Alor Star, Kedah.
1908. †AYRE, C. F. C., Ipoh, Perak.
1926. †BAGNALL, Hon. Mr. J., Straits Trading Co., Ltd., Singapore.
1919. †BAILEY, A. E., Mountmillan, Knowles Hill, Newton Abbott, England.
1923. BAILEY, A. S., Kuala Lumpur, Selangor.
1926. †BAILEY, JOHN, British Vice-Consulate, Nakawan Lampang, Siam.
1915. BAIN, NORMAN K., c/o Crown Agents, 4 Millbank, London.
1926. BAIN, V. L., Forest Department, Bentong, F.M.S.
1912. BAKER, A. C., M.C. Adviser's Quarters, Muar, Johore.
1926. BAKER, E. C., Eastern Rubber Co., Ltd., Singapore.
1921. †BALL, H., Education Department, Singapore.

1916. BANKS, H. H., Sanitary Board, Seremban, Negri Sembilan.
1899. †BANKS, J. E., The American Bridge Co., Cambridge, Pa., U.S.A.
1920. BARBOUR, DR. T., Museum of Comparative Zoology, Harvard University, Cambridge, Mass., U.S.A.
1926. BARNARD, B. H. F., Forest Department, Taiping, Perak.
1926. BARNES, CAPT. A. H., Pilot Association, Singapore.
1921. BARNES, J. R., Kuching, Sarawak.
1926. BARRACLOUGH, F. C., Victoria Institution, Kuala Lumpur.
1926. BARRIERE, P. H., 32-1, Cairnhill Road, Singapore.
1923. BATHURST, H. C., Labour Department, Penang.
1914. BAZELL, C., Malay College, Kuala Kangsar, Perak. (Hon. Librarian 1916-20; Hon. Treasurer 1921-2).
1926. BEACH, N. B., Kinta Kellas Estate, Batu Gajah, Perak.
1923. †BEAMISH, C. N. B., Education Department, Kuala Lumpur.
1921. BEARD, H., Asiatic Petroleum Co., Miri, Sarawak.
1923. BECKER, F. E., Wessyngton Estate, Rengam, Johore.
1925. BEE, R. J., F.M.S. Railways, Kelantan.
1921. BELGRAVE, W. N. C., Department of Agriculture, Kuala Lumpur.
1913. BELL, V. G., Ag. Conservator of Forests, Kedah.
1910. †BERKELEY, CAPT. H., I. S. O., Clink Gate, Droitwich, England.
1926. BERRY, MISS K. E., Raffles Girls School, Singapore.
1927. BEST, G. A., Botanical Gardens, Singapore.
1912. BICKNELL, J. W., U. S. Rubber Plantation, Penang.
1884. BICKNELL, W. A., 2, Phillips Avenue, Exmouth, Devon, England.
1922. BIGGS, L. A. C., Municipal Offices, Penang.
1924. BIRD, R., c/o Crown Agents, 4 Millbank, London.
1926. BIRKINSHAW, F., Agricultural Department, Taiping, Perak.
1926. BIRTWISTLE, W., Fisheries Department, Singapore.
1908. †BISHOP, MAJOR C. F., R. A.
1922. BISHOP, D. A., Raffles Institution, Singapore.
1926. BISHOP, R. O., Agricultural Department, Kuala Lumpur, Selangor.
1923. BLACK, J. G., Assistant Adviser's Office, Trengganu.
1921. BLACK, DR. K., General Hospital, Singapore.
1926. BLACKBURN, H. K., Malim Nawar South Ltd., Malim Nawar, Perak.
1923. †BLACKER, DR. G. O., "Sentosa," Brooklands Road Sale, Manchester, England.
1926. BLAIR, R. W., Institute for Medical Research, Kuala Lumpur, Selangor.

1884. BLAND, R. N., C.M.G., 25, Earl's Court Square, London, S.W. 5 (Council, 1898-1900; Vice-President, 1907-9).
1921. BLASDELL, REV. R., Anglo-Chinese School, Ipoh, Perak.
1926. BLOOMFIELD, C. W., Education Department, Alor Star, Kedah.
1925. BLYTHE, W. L., Chinese Protectorate, Kuala Lumpur, Selangor.
1926. BOOTH, A., Sungei Senarut Estate, Batu Anam, Johore.
1926. †BOSWELL, A. B. S., Forest Department, Taiping, Perak.
1910. BOULT, F. F., Limbang, Sarawak.
1919. †BOURNE, F. G., Coroner's Office, Singapore.
1926. BOWER, W. M. L., Fort Road, Malacca.
1921. BOYD, R., Co-operative Societies Department, Penang.
1927. BOYD, T. R., Hongkong Bank, Kuala Lumpur, Selangor.
1919. †BOYD, W. R., c/o Crown Agents, 4 Millbank, London.
1913. BRADDELL, R. ST. J., Braddell Bros., Singapore.
1926. BRETHERTON, E. H. S., Education Department, Taiping, Perak.
1926. BRIDGES, DR. D., Alor Star, Kedah.
1897. BROCKMAN, SIR E. L., K.C.M.G., c/o F.M.S. Agency, Cockspur St., London.
1926. BROOKS, A. C., Government Analyst's Office, Singapore.
1909. BROOKS, C. J., Church Gate House, Woolpit, Suffolk, England.
1915. BROWN, C. C., Taiping, Perak, (Vice-President, 1925).
1910. BROWN, D. A. M., Glugor, Penang.
1921. BROWNE, T. W., St. Hilier Estate, Bahau, Negri Sembilan.
1913. †BRYAN, J. M., The Borneo Co., Ltd., 28, Fenchurch Street, London.
1887. BRYANT, A. T., The Moorings, Falmouth, Cornwall, England. (Council, 1907-10; Vice-President, 1912, 1914-16).
1926. BUCKLE, Miss D. M., Raffles Girls School, Singapore.
1912. BURKILL, I. H., "Clova," The Mount, Fetcham Park, Leatherhead, England. (Council, 1913, 1921-3; Hon. Secretary, 1914-17; Vice-President, 1924).
1923. BURR, P. B. F., Ipoh, Perak.
1926. †BURTON, W., Kuala Lumpur, Selangor.
1921. BUTTERFIELD, H. M., Alor Star, Kedah.
1913. †CALDECOTT, A., C.B.E., Post Office, Kuala Lumpur.
1925. CALLENFELS, DR. P. VAN STEIN, Ponorogo, Java.
1916. CAMPBELL, Prof. J. A., National Institute for Medical Research, Hampstead, London. (Council, 1917, 1919).
1923. CAMPBELL, J. W., Malacca.

1926. CARDON, REV. FR. R., Taiping, Perak.
 1926. CARDWELL, H. F., Tangkah Estate, Tangkah, Johore.
 1925. CAREY, H. R., Malay College, Kuala Kangsar, Perak.
 1924. CARR, C. E., Tembeling, Pahang.
 1927. CARROLL, A. F., Forest Office, Kuala Lipis, Pahang.
 1921. †CAVENDISH, A., Kuala Lumpur, Selangor.
 1926. CARVER, HON. MR. G. S., Donaldson & Burkinshaw, Singapore.
 1926. CHAN SZE ONN, 64, Market Street, Singapore.
 1906. CHAPMAN, W. T., c/o Crown Agents, 4 Millbank, London.
 1926. CHARTER, J. R. N., Johore Bahru, Johore.
 1921. CHASEN, F. N., Raffles Museum, Singapore. (Council, 1925; Hon. Secretary 1927—).
 1924. †CHEESEMAM, H. R., Education Department, Johore Bahru.
 1926. CHELLIAH, D. D., Anglo Chinese School, Penang.
 1913. †CHOO KIA PENG, Kuala Lumpur, Selangor.
 1913. CHULAN, HON. RAJA DI-HILIR, C.M.G., Kuala Kangsar, Perak.
 1927. CLARK, B. F., Adamson Gilfillan & Co., Pontianak, Borneo.
 1921. CLARKE, H. T., Education Office, Singapore.
 1926. †CLARKE, G. C., "Tilton," 14, Gallop Road, Singapore.
 1923. CLARKSON, H. T., Raffles Hotel, Singapore.
 1921. CLAYTON, G. E., Alor Star, Kedah.
 1926. CLAYTON, HON. MR. R. J. B., The Residency, Kota Baharu, Kelantan.
 1911. †CLAYTON, T. W., Alor Star, Kedah.
 1925. CLEGG, R. P., Gopeng, Perak.
 1917. CLIFFORD, G. F. W., Lawas (Sarawak) Rubber Estate, Ltd., Lawas, Labuan.
 1923. COBBE, F., Free School, Penang.
 1922. COCHRANE, C. W. H., The Residency, Taiping.
 1922. COE, CAPT. T. P., M.C., c/o Crown Agents, 4 Millbank, London.
 1926. COLEMAN, C. G., High School, Malacca.
 1920. †COLLENETTE, C. L., Gothic Lodge, Woodford Green, Essex, England. (Council, 1922).
 1926. COLLINS, G. E. P., Mansfield & Co., Ltd., Penang.
 1926. COLMAN, E. E., c/o Crown Agents, 4 Millbank London.
 1926. COMMANDANT, The, Police Depot, Kuala Lumpur, Selangor.
 1926. CONSERVATOR OF FORESTS, F.M.S. & S.S., Kuala Lumpur, Selangor.
 1923. COOKSON, W. S., Seldings Estate, Selama, Perak.
 1926. COOPE, A. E., c/o Federal Secretariat, Kuala Lumpur.
 1927. COOPER, C. B., Jalan Ah Fook, Johore Bahru.

1926. COOPER, R. H., The Eastern Smelting Co., Dato Kramat Road, Penang.
1925. CORRY, W. C. S., Asst. Collector Land Revenue, Kuala Lumpur.
1926. COSGRAVE, Dr. A. K., Kuala Lumpur, Selangor.
1920. COTTERIFF, W. S., Miri, Sarawak.
1921. COULSON, N., Kota Bharu, Kelantan.
1921. COWAP, J. C., Government Analyst's Office, Singapore.
1923. †COWGILL, J. V., M.C., Land Office, Kuala Lumpur.
1921. CRANNA, GORDON, Young Men's Christian Association, Singapore.
1917. CRICHTON, R., c/o Crown Agents.
1921. CROCKER, H. B., Kuching, Sarawak.
1922. CROSS, A. B.,
1917. CUBITT, G. E. S., Kuala Lumpur, Selangor.
1926. CULLEN, S., 13, Collyer Quay, Singapore.
1921. †CULLEN, W. G., c/o Price Waterhouse & Co., Aguiar 71, Havana, Cuba.
1925. CULLIN, E. G., P.W.D., Dindings.
1927. CUMMING, C. E., Floral Villa, Ipoh, Perak.
1923. CURTIS, R. J. F., District Office, Dindings.
1926. DAKERS, C. H., M.C., c/o Police Courts, Singapore.
1922. DALTON, H. G., Subur Rubber Estates, Ulu Sepatang P.O., Perak.
1923. DALTON, N. D., Gadek Estate, Tampin, F.M.S.
1910. †DALY, M. D., Kuala Lumpur.
1924. DATO MUDA ORANG KAYA KAYA, Panglima Kinta, Jalan Istana, Ipoh, Perak.
1918. †DAVID, P. A. F., c/o Crown Agents.
1926. DAVIDSON, J., Caldbeck Macgregor & Co., Kuala Lumpur.
1925. DAVIES, D. J., 26, Sanford Road, Dublin, Ireland.
1927. DAVIES, E. R., Malay College, Kuala Kangsar, Perak.
1926. DAVIES, G. C., Victoria Institution, Kuala Lumpur, Selangor.
1927. DAWSON, C. W., District Office, Alor Gajah, Malacca.
1923. DAY, E. V. G., District Office, Raub, Pahang.
1926. DEL TUFO, M. V., Labour Office, Klang, Selangor.
1922. DENNY, A., Sungai Pelek Estate, Sepang, Selangor.
1903. †DESHON, H. F.,
1897. DICKSON, E. A., Batu Gajah, Perak.
1921. †DICKSON, Rev. P. L., The Grammar School, St. Ives, Hunts, England.
1927. DIRECTOR OF PUBLICATIONS, Princes Street, Westminster, London, S.W. 1.
1927. DODD, G. C., District Judge, Malacca.
1920. DODDS, Dr. H. B., General Hospital, Penang.
1926. †DOLMAN, H. C., Forest Office, Kuala Kangsar, Perak.
1923. †DOSCAS, A. E. COLEMAN, Agricultural Department, Kuala Lumpur.

1922. DRURY, CAPT. F., Bukit Zahara School, Johore Bahru, Johore.
1921. DRYBURGH, A. M., c/o Colonial Secretariat, Singapore.
1926. DUFF, DR. R. W., Taiping, Perak.
1910. DUNMAN, W., Grove Estate, Grove Road, Singapore.
1926. DUNN E. R., Alexandria, Va., U. S. A.
1915. †DUSSEK, O. T., Sultan Idris Training College, Tanjong Malim, Perak.
1922. EBDEN, W. S., Segamat, Johore.
1922. ECKHARDT, H. C., Alor Star, Kedah.
1922. EDGAR, A. T., Suffolk Estate, Sitiawan, Perak.
1927. EDUCATION DEPARTMENT, Alor Star, Kedah.
1926. EDWARDES, MAJOR W. A. D., Baling, Kedah.
1885. EGERTON, SIR WALTER, Fair Meadow, Mayfield, Sussex, England.
1921. ELDER, DR. E. A., British Dispensary, Singapore.
1926. ELEY, H. J., Colonial Secretariat, Singapore.
1922. ELLES, B. W., Hon. Mr. The Residency, Alor Star.
1918. ELLIOTT, F. M.,
1924. ELSTER, C., Kuala Han Estate, Kelantan.
1926. ENGLAND, A. R., Victoria Institution, Kuala Lumpur.
1926. ENSOR, T. D., c/o Messrs. Neill & Bell, 1, Old Market Square, Kuala Lumpur, Selangor.
1913. ERMEN, C., Kuching, Sarawak.
1923. †EU TONG SEN O.B.E., Sophia Road, Singapore.
1924. EVANS, I. H. N., Museum, Taiping, Perak. (Vice-President 1926-7).
1925. FAIRBURN, HON. MR. H., Stevens Road, Singapore.
1927. FARRELLY, G. A., Sandakan, British North Borneo.
1926. †FARRER, R. G. B., District Office, Pasir Puteh, Kelantan.
1909. FARRER, R. J., Municipal Offices, Singapore. (Council, 1925-1927).
1911. †FERGUSON-DAVIE, RT. REV. C. J., (Council, 1912-13).
1909. FERRIER, J. C., 28, Fenchurch Street, London, England.
1917. FINLAYSON, DR. G. A., "Changi," West Moors, Dorset, England.
1919. †FINNIE, W., Kininmouth Mains, Mintlaw Station, Aberdeen, Scotland.
1910. FIRMSTONE, H. W., Sentosa, Ripple, W. Dover, Kent, England. (Council, 1918-19; Vice-President, 1920).
1925. FITZGERALD, DR. R. D., Johore Bahru, Johore.
1924. FLEMING, E. D., Chinese Protectorate, Taiping, Perak.
1926. FLIPPANCE, F., Botanical Gardens, Penang.
1897. †FLOWER, MAJOR S. S., Spencersgreen, Tring, Herts, England.
1926. FLOWERDEW, A. H., Federated Buildings, High Street, Kuala Lumpur, Selangor.

1926. FORBES, G. D., Kinta Kellas Estate, Batu Gajah, Perak.
1926. FORD, P. B., 60, Klyne Street, Kuala Lumpur, Selangor.
1923. FOREST BOTANIST, Forest Research Institute, Dehra Dun, U. P. India.
1921. FORRER, H. A., Supreme Court, Singapore.
1918. †FOXWORTHY, DR. F. W., Forest Department, Kuala Lumpur, (Council, 1923, 1926-7).
1921. †FRASER, F. W., C.B.E.,
1908. †FREEMAN, D., 48, Wimborne Road, Bournemouth, Hants, England.
1926. FRODA, A. H., Ipoh Club, Ipoh, Perak.
1910. †FROST, HON. MR. MEADOWS, Resident Councillor, Malacca.
1922. FULLER, J. C., Tapah, Perak.
1912. †GALLAGHER, W. J., U. S. Plantations, Inc., Medan, Sumatra.
1924. GAMMANS, L. D., East Court, East Cosham, Hants, England.
1917. †GARNIER, REV. KEPPEL, Penang.
1923. GATER, B. A. R., Institute for Medical Research, Kuala Lumpur.
1926. GATFIELD, W. H., Chinese Protectorate, Singapore.
1920. GEALE, DR. W. J., Kuala Krai, Kelantan.
1926. †GEORGE, J. R., The Chartered Bank, Singapore.
1917. †GERINI, LT.-COL. G. C.
1927. GERMAN, R. L., Federal Secretariat, Kuala Lumpur, Selangor.
1903. GIBSON, HON. MR. W. S., Kuala Lumpur, Selangor.
1923. GILMAN, HON. MR. E. W. F., Kuala Lumpur, Selangor.
1923. GILMOUR, A., Govt. Monopolies, Singapore.
1902. †GIMLETTE, DR. J. D., Hillside, Upper Weston, Bath, Somerset, England.
1922. †GLASS, DR. G. S., Municipal Offices, Penang.
1918. GLOYNE, G. B., Burt Myrtle & Co., Batavia, Java.
1916. GOODMAN, HON. MR. A. M., Chinese Secretariat, Singapore.
1922. GORDON, T. I. M., General Post Office, Singapore.
1920. GORDON-HALL, CAPT. W. A., c/o Crown Agents, 4 Millbank, London.
1926. GOSS, P. H., Revenue Surveys, Taiping, Perak.
1909. GOULDING, R. R., Survey Department, Johore Bahru, Johore.
1926. GRAEME, A. W. S., Sentul, Selangor.
1927. GRAHAM, H. Gordon, Sungai Kruit Estate, Sungkai, Perak.
1924. GRAHAM, W. H., Malacca.
1926. GRANT, E. G., Jesselton, British North Borneo.

1923. GREEN, DR. P. WITNERS, Johore Bahru, Johore.
 1926. GREENE, R. T. B., Institute for Medical Research,
 Kuala Lumpur, Selangor.
 1924. GREIG, G. E., Kuala Lumpur, Selangor.
 1926. GRICE, N., Chinese Protectorate, Johore Bahru.
 1923. GRIEVE, C. J. K., Post Box No. 58, Klang, Selangor.
 1921. GRIFFITHS, C. S., Kuching, Sarawak.
 1911. GRIST, D. H., Department of Agriculture, Kuala
 Lumpur, Selangor.
 1922. GUBBINS, W. H. W., Mansergh & Taylor, Seremban,
 Negri Sembilan.
 1926. GUMMER, W. A., Survey Office, Malacca.
 1925. GUNN, R. F., Education Department, Penang.
 1916. GUPTA, SHIVA PRASAD, Naudansahu Street, Benares,
 City, India.
 1923. †HACKER, DR. H. P., Zoological Department, Uni-
 versity College, London, W.C. 1, England.
 1923. HAINES, MAJOR O. B., S. O. S. Estate, Selama, Perak.
 1923. HAKE, H. EGMONT, Barker & Co., Ltd., Kuala
 Lumpur, Selangor.
 1923. HALFORD, SIDNEY, F. M. S. Railways, Kuala Lumpur,
 Selangor.
 1922. HALL, A. C., Ocean Accident & Guarantee Corpora-
 tion Ltd., Singapore.
 1927. HALL, A. S., Gammon & Hall Ltd., Taiping, Perak.
 1914. HALL, J. D., Government Domain, Singapore.
 (Council, 1924, 1926-27).
 1911. †HALIFAX, F. J., Oakwood, Brampton, Cumberland,
 England.
 1915. HAMILTON, A. W., (Vice-President, 1922, 1925-7).
 Singapore.
 1926. HAMILTON, W., Penang Free School, Penang.
 1918. HAMPSHIRE HON. MR. A. K. E., Kuala Lumpur.
 1922. HAMPSHIRE, HON. MR. D. H., Boustead & Co., Selan-
 gor.
 1924. HAMZAH BIN ABDULLAH, Temerloh, Pahang.
 1923. HANCOCK, A. T., 22-2, Tanglin Road, Singapore.
 1922. HANITSCH, P. H. V., P.W.D., Alor Star, Kedah.
 1921. HARDIE, J. A. H., Kuching, Sarawak.
 1925. HARMER, F. E., Chief Police Office, Butterworth,
 Province Wellesley.
 1909. HARRINGTON, A. G., Municipal Offices, Singapore.
 1922. HARRISON, C. W.,
 1922. HARROWER, PROF. G., Medical College, Singapore.
 1921. HART, DR. H. H., 308 Locust Street, San Francisco,
 U.S.A.
 1921. HASHIM, CAPT. N. M., Parit Buntar, Perak.
 1926. †HASTINGS, W. G. W., 56, Klyne Street, Kuala Lumpur,
 Selangor.
 1926. HAWKES, CAPT. W. B., Batu Gajah, Perak.
 1921. HAWKINS, G., Secretariat, Kuala Lipis, Pahang.

1925. HAY, A. W.,
 1919. HAY, M. C., Kemaman, Trengganu.
 1921. HAYES, L. J., Fraser & Co., Singapore.
 1904. †HAYNES, A. S., c/o Federal Secretariat (Council, 1920).
 1922. HELLINGS, G. S., c/o Crown Agents.
 1926. HELPS, A., Alor Star, Kedah.
 1923. HEMMANT, G., Singapore.
 1926. HENDERSON, CAPT. A. M., Sandala Estate, Sandakan, British North Borneo.
 1925. HENDERSON, L., Sultan Idris Training College, Tanjong Malim, Perak.
 1921. HENDERSON, M. R., Botanical Gardens, Singapore.
 1923. HENGGELE, A. A., Kuala Lumpur, Selangor.
 1917. HEREFORD, G. A., c/o Crown Agents.
 1926. HERON, F. R., Singapore Cold Storage Co., Singapore.
 1927. HERROD, H. J., British Borneo Timber Co., Sandakan, British North Borneo.
 1921. HEWETSON, C., Lyall & Evatt, Singapore.
 1923. †HICKS, E. C., Education Department, Alor Star, Kedah.
 1878. HILL, E. C., 26, Highfield Hill, Upper Norwood, London, England.
 1922. HILL, W. C., Singapore Oil Mills Ltd., Havelock Road, Singapore.
 1922. HINDE, C. T., Mersing, Johore.
 1923. †HODGSON, D. H., Forest Department, Kuala Lumpur, Selangor.
 1921. HOLGATE, M. R., Education Department, Malacca.
 1926. HOLL, E. S., Kuching, Sarawak.
 1923. HOLLAND, A. D., Kapoewas Rubber Co., Ltd., Sungai Dekan, Pontianak, Borneo.
 1922. HOLTUM, R. E., Botanical Gardens, Singapore. (Hon. Treasurer, 1923-6).
 1921. HOOPS, HON. DR. A. L., Singapore.
 1917 †HOSE, DR. CHARLES, Redleaf, Riddledown Road, Purley, Surrey, England.
 1897. HOSE, E. S., C.M.G. The Manor House, Normandy, Guildford, England. (Vice-President, 1923, 1925; President, 1924).
 1926. HOWELL, MRS. E. F., "Sunnyside," Oxley Road, Singapore.
 1926. HOWITT, C. R., Jasin, Malacca.
 1923. HOWL, CAPT. F. W., Ipoh, Perak.
 1891. HOYNCK, VAN PAPENDRECHT, P. C., 38, Avenue Hoche, Paris VIII, France.
 1909. HUBBACK, T. R., Sunlaws, Bukit Betong, Kuala Lipis, Pahang.
 1922. HUGGINS, CAPT. J., M.C. Federal Secretariat, Kuala Lumpur.

1909. HUGHES, J. W. W., Land Office, Singapore.
 1926. HUGHES, R. W., c/o Boustead & Co., Ltd., Singapore.
 1907. HUMPHREYS, H. E. MR. J. L., c.B.E. Government House, Sandakan, British North Borneo. (Vice-President, 1922-5).
 1922. HUNT, CAPT. H. NORTH Asst. District Officer, Telok Anson, Perak.
 1921. HUNTER, DR. P. S., Municipal Offices, Singapore.
 1926. HUSSAIN BIN MOHAMED TAIB, District Office, Temerloh, Pahang.
 1925. HYDE, A., Rubber Restriction Office, Johore Bharu, Johore.
 1926. INCE, H. M., Langkon, British North Borneo.
 1922. IRVINE, CAPT. R., M.C. Colonial Secretariat, Singapore.
 1921. ISMAIL BIN BACHOK, DATO, S.P.M.J., Johore Bahru, Johore.
 1926. ISMAIL BIN HAJI PUTEH, Asst. Supt. Monopolies & Customs, Kulim, South Kedah.
 1921. IVENS, F. B., Bannon & Bailey, Kuala Lumpur, Selangor.
 1921. †IVERY, F. E., Alor Star, Kedah.
 1926. JACKSON, A., Mansfield & Co., Ltd., Singapore.
 1926. JACOBS, C. E. H., Education Dept., Singapore.
 1925. JACQUES, E. V. H., c/o Mrs. Warren, 5, Wamborough Road, Oxford, England.
 1922. JAGO, E., District Office, Tanjong Malim.
 1918. †JAMES, D., Goebilt, Sarawak.
 1927. JAMIESON, M., Government Analyst, Singapore.
 1907. JANION, E. M., 5, Gracechurch Street, London, E.C.3.
 1918. JANSEN, P. J., 6, Wilhelminalaan, Park de Kieviet, Wassenaar, Holland.
 1924. JANTAN OMAR, Jesselton, British North Borneo.
 1926. JEFFERSON, J. P., Miri, Sarawak.
 1926. JEFFERSON, J. W., Education Office, Singapore.
 1911. JELF, A. S., Kingston, Jamaica.
 1921. †JERMYN, L. A. S., Government English School, Batu Pahat, Johore.
 1926. JERVOISE, R. S., Krian, Perak.
 1910. JOHNSON, B. G. H., Crossways, Littlehampton, Sussex, England.
 1925. JONES, A. E. THORNLEY, Mansfield & Co., Singapore.
 1918. †JONES, E. P.,
 1913. JONES, S. W., Johore Bahru.
 1919. †JORDAN, A. B., Sanitary Board, Ipoh.
 1926. KAHAR BIN YAMTUAN ANTAH, Tengku, Kuala Pilah, Negri Sembilan.
 1926. KASSIM BIN CHE ISMAIL, State Council Office, Alor Star, Kedah.

1921. KASSIM BIN SULTAN ABDUL HAMID HALIMSHAH, TUNKU, Alor Star, Kedah.
1921. †KAY-MOUAT, DR. J. R., Medical College, Singapore.
1927. KEBLE, W. T., Sandakan, British North Borneo.
1926. KEET, MRS. H. G., c/o Inspector of Schools, Singapore.
1926. KEIR, A., Education Office, Taiping, Perak.
1926. KEITH, H. G., Forest Department, Sandakan, British North Borneo.
1921. †KELLIE, J., Dunbar Estate, Neram Tunggal P. O., Chagar Perah, Pahang.
1913. KEMPE, J. E., District Officer, Taiping.
1922. †KER, W. P. W., Paterson Simons & Co., Ltd. Singapore.
1920. †KERR, DR. A. F. G., Bangkok, Siam.
1926. KHOO KENG HOON, Chow Kit & Co., Ltd., Kuala Lumpur, Selangor.
1926. KHOO SIAN EWE, 24, Light Street, Penang.
1921. KIDD, G. M., M.C., District Office, Tampin, F.M.S.
1920. KING, E. M., Kong Lee (Perak) Plantations Ltd., Bagan Serai, Perak.
1927. KING, S. E., Chinese Protectorate, Ipoh.
1926. KINGSBURY, DR. A. N., Medical Institute, Kuala Lumpur.
1926. KINNEIR, DR. D., Rim Estate, Jasin, Malacca.
1916. KINSEY, W. E., Forest House, Seremban, Negri Sembilan.
1921. KITCHING, T., Survey Department, Kuala Lumpur, Selangor.
1900. KLOSS, C. BODEN, Raffles Museum, Singapore. (Council 1904-1908, 1923, 1927; Vice-President 1920-1921, 1927; Hon. Secretary 1923-26).
1915. KNIGHT, V., Fairgreen Cottage, Glemsford, Suffolk, England.
1926. KUPPUSAMY, V. D., Anglo Chinese School, Parit Buntar.
1924. LAMBOURNE, J., Exp. Plantation, Serdang, Sungei Besi, Selangor.
1926. LAMIN BIN KASSIM, Police district, Lahat, Perak.
1926. LANCASTER, A. P., "Pinang Gazette," 9 Union Street, Penang.
1926. LANKAMIN BIN HAJI MUHAMMAD TAHIR, Kuala Krai, Kelantan.
1925. LAWES, G. H., Police Headquarters, Kuala Lumpur, Selangor.
1927. LAYCOCK, J., Raffles Place, Singapore.
1926. LAYMAN, E. C. H., Section Engineers Office, F. M. S. R., Kuala Gris, Kelantan.
1923. †LEASE, F. E., Sapong Estate, Tenom, British North Borneo.

1927. LEDDIN, N., c/o Mr. G. Forbes, Kinta Kellas Estate, Batu Gajah, Perak.
1921. †LEE, L. G., Labu Estate, British North Borneo.
1922. LEECH, R. F. V., Tapah, Perak.
1926. LE FEVRE, S., Straits Steamship Co., Singapore.
1922. †LEGGATE, J., Railway Construction, Kuala Lumpur, Selangor.
1913. LEICESTER, DR. W. S., Kuantan, Pahang.
1894. †LEMON, A. H., C.M.G., Hillbrow, Reigate, Surrey, England. (Vice-President, 1916-18).
1920. LENDRICK, J., 30 Norre Alle, Aarhus, Denmark.
1926. LEONARD, H. G. R., Treasury, Kuala Lumpur, Selangor.
1925. †LEONARD, R. W. F., Mansfield & Co., Ltd., Singapore.
1926. LEUTHOLD, W. H., Hooglandt & Co., Singapore.
1926. LEWIS, D. T., 35, Bewdley Road, Stourport, Worcestershire, England.
1890. LEWIS, J. E. A., Harada 698, Kobe, Japan.
1926. LEWIS, Miss M. B., Government Girls' School, Penang.
1927. LEYH, S. G. H., Colonial Secretariat, Singapore.
1922. LEYNE, E. G., Sungai Purun Estate, Seminyih, Selangor.
1926. LIAS, E. T. M., Education Dept, Penang.
1926. LIM CHENG KUNG, The Criterion Press Ltd., Penang.
1915. LIM CHENG LAW, 70, Beach Street, Penang.
1926. LIM ENG KAH, 6J, Old Pudu Road, Kuala Lumpur, Selangor.
1925. LINEHAN, W., Kuala Lipis, Pahang.
1924. LOCK, J. T., Eastern Extension Telegraph Co., Cocos-Keeling Islands.
1926. LOGAN, S. S., Chartered Bank, Klang, Selangor.
1918. LOH KONG IMM.
1914. LORNIE, Hon. Mr. J., Residency, Kuala Lumpur.
1922. LOWINGER, V. A., Survey Department, Kuala Lumpur, Selangor.
1907. †LYONS, Rev. E. S., Methodist Publishing House, Manila, Philippine Islands.
1926. MACASKILL, Dr. D. C., Kuala Lumpur, Selangor.
1920. †MACBRYAN, G. T. M., Kuching, Sarawak.
1926. MACDONALD, J., Chartered Bank, Kuala Lumpur, Selangor.
1910. †MACFADYEN, E., Sports Club, London.
1920. MACKIE, VIVIAN, Kuala Lumpur, Selangor.
1922. MACKNESS, L. R., Kuala Lumpur, Selangor.
1921. MACMILLAN, I. C., S.S. Police, Singapore.
1918. MADGE, R., Kuala Lumpur, Selangor.
1924. MAHMUD BIN MAT, District Office, Kuala Lipis, Pahang.
1923. MAHMUD BIN MOHD. SHAH, Batu Pahat, Johore.

1903. MAKEPEACE, W., 22 Holmes Grove, Henleaze, Bristol, England. (Council, 1914, 1916, 1920; Hon. Libr. 1909-12; Vice-President, 1917; Hon. Sec. 1918-19).
1926. MALAY COLLEGE, THE, Kuala Kangsar, Perak.
1927. MALLESON, B. K., Sungai Kruit Estate, Perak.
1921. MANCHESTER, H. L., Municipal Offices, Singapore.
1922. MANN, G. E., Kuala Lumpur.
1916. MANN, W. E., Burt Myrtle & Co., Batavia, Java.
1907. †MARRINER, J. T., Kuantan, Pahang.
1902. MARRIOT, SIR H., K.B.E. C.M.G., Colonial Secretariat, Singapore. (Council, 1907-8, 1910-3, 1915-8; V.-Pres., 1919, 1923, 1925-6).
1926. MARSDEN, H., Institute for Medical Research, Kuala Lumpur.
1920. MARSH, W., Municipal Offices, Singapore.
1927. MARSHALL, A. O., Borneo Motors, Kuala Lumpur.
1909. MARSHALL, H. B., Carbis Bay, Cornwall, England.
1925. †MARTIN, W. M. E., 12, Norham Road, Oxford, England.
1923. MARTYN, C. D., Jesselton, British North Borneo.
1921. MATHER, N. F. H., Federal Secretariat, Kuala Lumpur.
1926. MATTHEWS, J. J., Jelutong Division, Rembia Estate, Malacca.
1921. MAXWELL, C. N., Sitiawan, Perak.
1922. MAY, P. W., Poste Restante, Singapore.
1914. MEAD, J. P., Kuching, Sarawak.
1924. MEADE, J. M., Teluk Anson, Perak.
1927. MEGAT YUNUS BIN ISA, Land Office, Teluk Anson, Perak.
1926. MIDDLEBROOK, S. M., Chinese Protectorate, Singapore.
1926. MIDDLEMAS, N. A., Kuching, Sarawak.
1926. †MILES, C. V., Rodyk & Davidson, Singapore.
1926. MILLAR, G. R. M., Tranquerah, Malacca.
1920. MILLAR, G. W. R., 41, Coates Gardens, Edinburgh, Scotland.
1925. MILLER, G. S., Mansfield & Co., Ltd., Penang.
1921. †MILLER, J. I., Kuantan, Pahang.
1926. MILLINGTON, W. M., Chairman Sanitary Board, Kuala Lumpur.
1925. MILLS, G. R., Kinta Kellas Estate, Batu Gajah, Perak.
1926. MILLS, J. V., c/o Crown Agents, 4 Millbank, London.
1924. MILLS, L. L., c/o Commissioner of Police, Kuala Lumpur.
1925. MILNE, CHARLES, 420, Great Western Road, Aberdeen, Scotland.
1925. MINTO, G., British American Tobacco Co., Singapore.

1919. MISSIONARY RESEARCH LIBRARY, 419 Fourth Avenue,
New York City.
1924. MOHAMED IBNI SULTAN ABDUL HALIMSHAH, TENGKU,
Alor Star, Kedah.
1922. MOHAMED ISMAIL MERICAN BIN VAFOO MERICAN
NOORDIN, Legal Adviser's Office, Alor Star, Kedah.
1927. MOHAMED NOOR BIN MOHAMED, Free School, Penang.
1922. MOHAMED SAID, CAPT. HAJI, Bukit Timbalan, Johore
1921. MOHAMED SALLEH BIN ALI, DATO, Johore Bahru,
Johore.
1921. MOHAMED SHERIFF BIN OSMAN, Office of the Director
of Lands, Alor Star, Kedah.
1926. MOHAMED AMEEN AKBAR, 4, Birch Road, Kuala
Lumpur.
1926. MOIR, G. T., c/o Sarawak Oilfields Ltd., Miri,
Sarawak.
1920. MONK, H. F., District Office, Upper Perak.
1926. MONTGOMERIE, A., Kota Bharu, Kelantan.
1926. MOONSHI, DR. H. S., Moonshi Dispensary, 742, North
Bridge Road, Singapore.
1921. MORGAN, S., Wilde & Co., Ltd., 12 Market Street,
Kuala Lumpur, Selangor.
1926. †MORICE, JAMES, Kuantan, Pahang.
1920. †MORKILL, A. G., District Office, Malacca.
1924. MORRIS, L. A. G., F.M.S. Police, Kuala Lumpur.
1920. MOWBRAY, G. A. de C., Commissioner of Lands,
Trengganu.
1926. MUHAMMAD EUNOS BIN ABDULLAH, HON. INCHE,
Lembaga Malayu, 20a Collyer Quay, Singapore.
1926. MUMFORD, E. W., Pekan, Pahang.
1915. †MUNDELL, H. D., Sisson & Delay, Singapore.
1913. MURRAY, REV. W., Gilstead Road, Singapore.
1926. MUSTAFFA ALBAKRI, Kuala Kangsar, Perak.
1926. MYDDELTON, H., The Residency, Tawao, British
North Borneo.
1909. MCARTHUR, M. S. H., c/o Crown Agents, 4 Millbank,
London.
1920. MCCABE, DR. J. B., Kapoewas Rubber Estate,
Soengei Dekan, Pontianak, Borneo.
1926. McDONOUGH, J., Alor Star, Kedah.
1926. MCGREGOR, R. H., Chartered Bank, Taiping, Perak.
1923. MCKERRON, P. A. B., Besut, Trengganu.
1910. MCLEAN, L., c/o Crown Agents, 4 Millbank, London.
1921. MCLEOD, D., King Edward's School, Taiping, Perak.
1917. NAGLE, REV. J. S., 2732, N. Calvert Street, Baltimore,
Md., U.S.A.,
1925. NAIDU, J. R., 142, Race Course Road, Singapore.
1922. NASH, G. H., Kuala Pilah, Negri Sembilan.
1927. NATIVIDAD, P., Forestry Dept., Sandakan, British
North Borneo.
1926. NEAVE, J. R., Asst. Adviser, Kota Tinggi, Johore.

1926. NEIL, W. H. E., Topographical Surveys, Taiping, Perak.
1921. NEILSON, Major J. B., M.C. Raffles Institution, Singapore.
1926. NICHOLAS, DR. C. J., General Hospital, Alor Star, Kedah.
1923. NICHOLSON, J. E. H., The Eastern Extension Telegraph Co., Labuan, Borneo.
1927. NISBET, W., E. A. Barbour Ltd., Union Building, Singapore.
1923. NIXON, H. E., Devon Estate, Malacca.
1906. NUNN, B., c/o Crown Agents, 4 Millbank, London. (Council, 1922).
1923. O'CONNELL, Lt. B. M., Police Officers Mess, Kuala Lumpur.
1926. OLIVE, CAPT. V. G., Europe Hotel, Singapore.
1926. OMAR BIN ENDOK, DATO, Segamat, Johore.
1911. O'MAY, J., Harrisons & Crosfield Ltd., 1-4 Great Tower Street, London, England.
1916. ONG BOON TAT, 51, Robinson Road, Singapore.
1926. ONG TENG NGAH, Victoria Institution, Kuala Lumpur, Selangor.
1925. ONRAET, R. H., Chief Police Office, Singapore.
1923. OPIE, R. S., Box 140, Kuala Lumpur, Selangor.
1926. ORANG KAYA KAYA STIA BEJAYA DI RAJA, Kuala Kangsar, Perak.
1921. ORCHARD, H. A. L., Chinese Free School, Cecil Street, Singapore.
1927. OSMAN BIN TALIB, Land Office, Taiping, Perak.
1920. O'SULLIVAN, T. A., Education Office, Kuala Lumpur.
1913. OVERBECK, H., Behn Meyer & Co., Ltd., Sourabaya, Java.
1925. OWEN, A. T., Rinching Estate, Semenyih, Selangor.
1922. PAGE-TURNER, F. W.,
1919. PARK, MUNGO, P. O. Delivery 19, Kuala Lumpur, Selangor.
1908. †PARR, C.W.C., C.M.G., O.B.E., c/o Crown Agents (vice-President, 1919).
1926. PARRY, B. B., P. O. Box 42, Miri, Sarawak.
1927. PARTRIDGE, A. T., Jesselton, British North Borneo.
1922. PASQUAL, J. C., Perlis, Kedah.
1921. †PATERSON, MAJOR H. S., c/o Crown Agents, 4 Millbank, London.
1926. PATTERSON, MRS. M. W., 6 Cairnhill Circle, Singapore.
1921. PEACH, REV. P. L., 68, Larut Road, Penang.
1926. PEALL, G. T., Raffles Institution, Singapore.
1921. PEDLOW, J., Penang.
1922. PEEL, HON. MR. W., C.M.G., Carcosa, Kuala Lumpur.
1926. PENANG LIBRARY, Penang.
1921. †PENDLEBURY, H. M., F.M.S. Museums, Kuala Lumpur, Selangor.

1926. PENGILLEY, E. E., District Office, Kuala Kangsar, Perak.
1924. PENNEFATHER-EVANS, J. P., F. M. S. Police, Kuala Lumpur, Selangor.
1925. †PENRICE, W., c/o Mansfield & Co., Singapore.
1914. PEPYS, W. E., The Royal Colonial Institute, Northumberland Avenue London, W.C. 2.
1920. PERKINS, C. J., Survey Department, Kuala Lumpur, Selangor.
1920. PESKETT, A. D., African Direct Telegraph Co., Freetown, Sierra Leone.
1920. PETERS, E. V., Pontianak, Borneo.
1925. PIJPER, DR. G. F., Kramat 61, Weltevreden, Java.
1927. PITT, ISAAC, Bried Estate, Bagan Serai, Perak.
1921. †PLUMMER, W. P., The Observatory, Bidston, Birkenhead, England.
1926. PONNIAH, H. V., Victoria Institution, Kuala Lumpur.
1910. PRATT, CAPT. E., Butterworth, Province Wellesley.
1926. PREEDY, B., Anderson School, Ipoh, Perak.
1926. PROUDFOOT, D. Y., Kuching, Sarawak.
1924. PURCELL, V. W. W. S., Chinese Protectorate, Penang.
1926. PURDOM, MISS N., Education Office, Kuala Lumpur, Selangor.
1906. PYKETT, REV. G. F., Principal, Anglo-Chinese School, Penang.
1926. QUAH BENG KEE, 15, China Street, Penang.
1926. RAE, CECIL, Ipoh, Perak.
1924. RAJA BENDAHARA OF PERAK, Kuala Kangsar, Perak.
1924. RAJA KECHIL TENGAH, Taiping, Perak.
1924. RAJA MUDA OF PERAK, C.M.G., Teluk Anson, Perak.
1924. RAJA OMAR BIN RAJA ALI, Court House, Ipoh, Perak.
1926. RAJA PETRA BIN RAJA MAHMUD, District Office, Kajang, Selangor.
1926. RAJA YA'ACOB BIN JA'AFAR, Magistrate, Klang, Selangor.
1924. RAMBAUT, A. E., Forest Department, Kuala Lumpur, Selangor.
1924. RASMUSSEN, H. C., East Asiatic Co., Singapore.
1917. RATTRAY, DR. M. J., c/o Europe Hotel, Singapore.
1916. RAYMAN, L., Federal Secretariat, Kuala Lumpur, Selangor.
1923. READE, C. C., Kuala Lumpur, Selangor.
1926. †REAY, MR. JUSTICE J. McCABE, Judge's House, Johore Bahru, Johore.
1927. REDHEAD, LT. COM. N. R. F., Grindlay & Co., 54 Parliament Street, London, S.W. 1.
1924. REED, J. G., Klang, Selangor.
1910. †REID, DR. ALFRED, Kuala Lumpur, Selangor.
1926. RENNIE, A. A., Kuching, Sarawak.
1921. †REX, MARCUS, Kuala Lumpur, Selangor.
1926. RHODES, H., Logan & Ross, Penang.

1915. RICHARDS, A. F., Federal Secretariat, Kuala Lumpur.
(Council, 1923, 1926-7).
1911. RICHARDS, R. M., Caledonia Estate, Province
Wellesley.
1923. RIDOUT, F. G., Harbour Board, Singapore.
1926. †RIGBY, W. E., Chartered Bank, Singapore.
1918. RITCHIE, C., Reko Hill, Kajang, Selangor.
1926. ROBERTS, G., Malaya Tribune, Singapore.
1926. ROBERTSON, I. D., P.W.D., Alor Star, Kedah.
1912. ROBERTSON, J., The Arcade, Singapore.
1926. ROBINSON, F., Alor Star, Kedah.
1911. †ROBINSON, H., 55 St. George's Square, London, S.W. 1.
(Council, 1916-20; Vice-President, 1922-3).
1926. ROBINSON, P. M., Eastern Smelting Co., Ltd., Penang.
1923. ROBSON, J. M., Malay Mail Office, Kuala Lumpur,
Selangor.
1916. ROGERS, A., Public Works Dept., Singapore.
1926. ROGERS, M. F., Vimy Estate, Kundang, Kuang,
Selangor.
1924. ROOKE, C. E., F.M.S. Railways, Kuala Lumpur.
1921. ROSS, E. A., M.C., Singapore.
1917. †ROWLAND, W. R.,
1922. RUSSELL, D. J. A., Kuala Lumpur, Selangor.
1921. RUSTON, J. A. V., MacLaine Watson & Co., Batavia,
Java.
1921. RUTTER, MAJOR E. O., The Croft, Wargrave, Berks,
England.
1924. RYVES, V. W., Takau Estate, Rantau, Negri Sem-
bilan.
1926. SAID JAN BIN SAID ASGAR ALI, Government English
School, Sungai Patani, Kedah.
1924. SAMAH BIN HAJI ALI, Pekan, Pahang.
1926. SANDS, F. C., Malaya Publishing House, Singapore.
1926. SANGER-DAVIES, A. E., Forest Office, Kuala Lumpur.
1921. SANGUINETTI, MAJOR W. R., O.B.E., Alor Star, Kedah.
1923. †SANSOM, C. H., Police Headquarters, Singapore.
1919. †SANTRY, D., c/o Swan & Maclaren, Singapore.
1896. †SAUNDERS, C. I., Glade House, Tadworth, Surrey,
England. Vice-President, 1910-1, 1914-5; Presi-
dent, 1916-8).
1923. SAVAGE, H. E., Kuala Trengganu, Trengganu.
1926. SAYID HASSAN BIN SAYID ZAIN, Ag. Land Officer, Yen,
Kedah.
1926. SAYID HUSSAIN BIN SAYID DARUS, Audit Office, Alor
Star, Kedah.
1926. SAYID JAN BIN SAYID ASGAR ALI, Government English
School, Sungai Patani, Kedah.
1922. SAYID MOHAMED IDID BIN ALI IDID, Alor Star, Kedah.
1926. SAYID OMAR BIN ABDULLAH SHAHABUDIN, State Coun-
cil Office, Alor Star, Kedah.

1926. SAYID SHAIDALI, Government English School, Kuala Kangsar, Perak.
1921. SCHIDER, DR. R. P. O. Box 12, Miri, Sarawak.
1926. SCOTT, MISS A. M.,
1910. SCOTT, HON. MR. R., M.C.S., Resident Councillor, Penang.
1920. †SCOTT, DR. WAUGH, Sungai Siput, Perak.
1906. SCRIVENOR, J. B., Batu Gajah, Perak. (Vice-President 1922, 1924, 1926-7).
1915. †SEE TIONG WAH, Balmoral Road, Singapore.
1922. SEHESTED S., Chartered Bank, Penang.
1927. †SELLS, H. C., 11 Manor Grove, Tonbridge, Kent, England.
1926. SHANNON, S. L., Harvard Estate, Bedong, Kedah.
1923. SHEARN, E. D., c/o Pooley & Co., Klyne Street, Kuala Lumpur.
1926. SHEFFIELD, J. N., Topographical Surveys, Taiping, Perak.
1927. SHEFFIELD, W. D., Tanjong Pau Estate, Jitra, Kedah.
1923. SHEIKH ABDULLAH BIN YAHYA, LT., Bukit Timbalan, Johore.
1925. SHELLEY, M. B., Singapore.
1925. SHORLAND, C. W., Labour Office, Penang.
1924. SIME, F. D., Bukit Lintang Estate, Malacca.
1926. SIMMONS, J. W., Trengganu.
1921. SIMPSON, P., Presgrave & Mathews, Penang.
1927. SIMPSON-GRAY, L. C., P. O. Box 213, Madras, India.
1909. †SIMS, W. A., 30, Park Hill, Carshalton, near London.
1921. SIRCOM, H. S., c/o Crown Agents, 4 Millbank, London.
1926. SKINNER, C. F., Beaufort, Jesselton, British North Borneo.
1921. SKRINE, W. F. DE V., Mukah, Sarawak.
1926. †SLEEP, A., Kuala Selangor, Selangor.
1922. SMALL, A. S., Treasury, Johore Bahru.
1922. SMART, DR. A. G. H., Chief Medical Officer, Penang.
1924. SMEDLEY, NORMAN, Raffles Museum, Singapore. (Hon. Treasurer, 1926-7).
1926. SMITH, C.
1912. SMITH, PROF. HARRISON W., c/o John W. Worthington, Esq., 30 State Street, Boston, Mass., U.S.A.
1924. SMITH, J. D. MAXWELL, Temerloh, Pahang.
1921. SMITH, CAPT. S. R., Kuala Lumpur, Selangor.
1910. SONG ONG SIANG, C.B.E. Aitken & Ong Siang, Singapore.
1921. SOUTH, F. W., Department of Agriculture, Kuala Lumpur.
1921. SPEERS, W. E., Alor Star, Kedah.
1925. SPROULE, HON. MR. JUSTICE P. J., Supreme Court, Penang.
1927. STAINES, E. A., Post Office, Taiping, Perak.

1918. STANTON, DR. A. T., Colonial Office, Downing Street, London, S.W. 1.
1925. STARK, W. J. K., Ulu Selangor, Selangor.
1926. STEPHENSON, MISS E. M., Bukit Tanggah, Singapore.
1926. STEVENS, E. H., British American Tobacco Co. (Straits) Ltd., Keppel Road, Singapore.
1920. STEVENS, F. G., Singapore.
1910. †STILL, A. W., c/o Straits Times (Council, 1914-15).
1917. †STIRLING, W. G., Chinese Protectorate, Singapore. (Council, 1923-5, 1927).
1921. STOOKE, G. BERESFORD, Secretariat, Nairobi, Kenya, East Africa.
1921. STOWELL, DE LA M., Bukit Mertajam, Province Wellesley.
1926. STREET, A. C., 13 Palm Bungalow, Kuching, Sarawak.
1926. STROUTS, E. A., Kuala Pilah, Negri Sembilan.
1927. STRUGNELL, E. J., Forest Office, Kuala Lumpur.
1921. STURBINGTON, W. H., Bentong, Pahang.
1910. STURROCK, A. J., c/o Crown Agents (Vice-President, 1924).
1926. SULTAN IDRIS TRAINING COLLEGE, Tanjong Malim, Perak.
1927. SUNGAI PATANI GOVERNMENT ENGLISH SCHOOL, Sungai Patani, Kedah.
1921. SUTCLIFFE, H., Research Laboratory, Pataling, Selangor.
1912. SWAYNE, J. C., Rejang, Sarawak.
1926. SWINDELL, VEN. F. G., 9 Fort Canning Road, Singapore.
1923. SWORDER, G. H., Taiping, Perak.
1926. SWORDER, J. C., Pekan, Pahang.
1918. †SYKES, G. R., Chinese Protectorate, Kedah.
1925. TALALLA, BENJAMIN, 12 Perak Road, Kuala Lumpur, Selangor.
1927. TALLACK, C. C., Silimpopon, East Coast Residency, British North Borneo.
1908. TAN CHENG LOCK, HON. MR., 59, Heeren Street, Malacca.
1926. †TAN SOO BIN, 9, Boat Quay, Singapore.
1926. TAY, L. H., Victoria Institution, Kuala Lumpur, Selangor.
1913. TAYLER, C. J., Kuala Sepang Coconut Estate, Sepang, Selangor.
1921. TAYLOR, E. R., Newlands, Grange-over-Sands, Lancashire, England.
1925. TAYLOR, W. C., Butterworth, Province Wellesley.
1925. TAYLOR, W. R., Maclaine Watson & Co., Batavia, Java.
1926. TEMPLETON T. V., Alor Star, Kedah.
1926. TERMANSSEN, V., Kuala Han, Kelantan.
1921. TERRELL, A. K. A. B., Presgrave & Mathews, Penang.

1927. THAVAR, K. V., Methodist Boys' School, Kuala Lumpur.
1927. THILLAIMUTHU, S., Kennedy Burkill & Co., Ltd., Ipoh, Perak.
1921. †THOMAS, L. A., Chief Police Office, Singapore.
1926. THOMAS, T. J., King Edward VII School, Taiping, Perak.
1927. THOMSON, G. M., Gunong Ledang Estate, Tangkah, Johore.
1920. THOMSON, HON. MR. H. W., C.M.G., British Residency, Taiping, Perak.
1923. THORNE, HON. MR. JUSTICE W. H., Ipoh, Perak.
1925. THURSTON, J. B. H., Kota Tinggi Estate, Kota Tinggi, Johore.
1926. TIDMAN, S. T., 8 Connaught Road, Leytonstone, Essex, England.
1927. TOYO BUNKO, 26 Kami-Fujimayecho, Hongo, Tokyo, Japan.
1927. TURNER, R. A., Asiatic Petroleum Co., Singapore.
1923. UNDANG OF REMBAU, c/o Kendong Station, Negri Sembilan.
1925. VENABLES, O. E., Brunei, Borneo.
1927. VETHAVANAM, J. R., Bungsar Road, Kuala Lumpur.
1926. †WADDELL, Miss M. C., Government Girls School, Alor Star, Kedah.
1922. WALKER, E. G., United Engineers Ltd., Singapore.
1926. WALKER, H. H., Klang, Selangor.
1926. †WALLACE, W. A., Revenue Surveys, Taiping, Perak.
1926. WALSH, N. P., Mansfield & Co., Ltd., Penang.
1921. WALTON, B. S., Kota Bharu, Kelantan.
1926. WAN HARON BIN WAN DAIN, Lower Court, Alor Star, Kedah.
1926. WAN IBRAHIM BIN WAN SALLIM, Lower Court, Alor Star, Kedah.
1923. WAN IDRIS BIN IBRAHIM, Muar, Johore.
1926. WAN MOHAMED ALI BIN OMAR, District Office, Kuantan, Pahang.
1922. WAN YAHYA BIN WAN MOHAMED TAIB, Alor Star, Kedah.
1922. WARD, D. J.
1927. WATSON, E. L., Kuala Lumpur, Selangor.
1917. WATSON, J., Education Office, Kuala Lumpur, Selangor.
1916. WATSON, J. G., Forest Department, Kuala Lumpur, Selangor.
1916. WATSON, SIR MALCOLM, Klang, Selangor.
1926. WEEDON, W. C. MOORES, Ag. Commissioner of Lands, Jesselton, British North Borneo.
1926. WELLINGTON, A. R., Kuala Lumpur, Selangor.
1926. WHEATLEY, M., Victoria Institution, Kuala Lumpur, Selangor.

1926. WHEELER, L. R., Education Office, Malacca.
 1927. WHITE, REV. GRAHAM, Parsonage, Ipoh, Perak.
 1910. WHITEHEAD, C. B., Police Office, Butterworth, Province Wellesley.
 1923. WHITFIELD, L. D., Malay College, Kuala Kangsar, Perak.
 1926. †WILCOXSON, W. J., The Straits Trading Co., Ltd., Singapore.
 1926. WILHELM, O., Sarawak Oilfields Ltd., Miri, Sarawak.
 1926. WILKINSON, G., Forest Office, Batu Gajah, Perak.
 1926. WILKINSON, H., Asiatic Petroleum Co., Penang.
 1923. WILKINSON, H. B., 65, Harcourt Terrace, London, S.W. 10.
 1920. †WILKINSON, R. J., C.M.G., Post Restante, Mitylene, Greece.
 1926. †WILLAN, T. L., Gopeng Road, Batu Gajah, Perak.
 1921. WILLBOURN, E. S., Batu Gajah, Perak.
 1926. WILLIAMS, A., District Office, Nibong Tebal, Province Wellesley.
 1922. WILLIAMS, E. B., Fed. Secretariat, K. Lumpur.
 1921. WILLIAMS, E. T., Colonial Secretariat, Singapore.
 1922. †WILLIAMS, F. L., Chinese Protectorate, Singapore.
 1921. WILLIAMS, R. M., Paterson Simons & Co., Ltd., S'pore.
 1927. WILLIAMSON, PROF. K. B., Medical College, Singapore.
 1925. WILSON, C., Labour Office, Kuala Lumpur.
 1926. WILSON, E. H., Malacca.
 1919. WILSON, F. K., Supreme Court, Singapore.
 1910. †WINKELMANN, H.
 1926. WINNINGTON-INGRAM, E. A., Kuala Lumpur.
 1923. WINSON, V. H., Posts & Telegraphs, Malacca.
 1904. WINSTEDT, HON. MR. R. O., C.M.G., D. Litt., Education Office, Singapore. Vice-President, 1914-15, 1920-21, 1923-25; President 1927).
 1925. WITCOMB, L. A., Adamson Gilfillan & Co., Ltd., Penang.
 1918. WOLDE, B., Kapar Estate, Kapar, Selangor.
 1902. WOLFF, HON. MR. E. C. H., C.M.G., Residency, Seremban.
 1927. WOOD, D. D., Sandakan, British North Borneo.
 1908. †WOOD, E. G., King & Co., 65 Cornhill, London.
 1913. WOOD, W. L., Sungai Nibong Estate, Batu Tiga, Selangor.
 1920. WOOLLEY, G. C., Sandakan.
 1922. WOOLLEY, H. W., Batu Gajah, Perak.
 1927. WOOLLEY, J. B., Sarawak Oilfields Ltd., Miri, Sarawak.
 1922. WORLEY, N. A., Kuala Lumpur, Selangor.
 1911. WORSLEY-TAYLOR, F. E., Newton Hall, Newton, Clitheroe, England.
 1905. †WORTHINGTON, HON. MR. A. F., Kuala Lipis, Pahang. (Vice-President, 1924).

1921. WURTZBURG, MAJOR, C. E., Mansfield & Co., Ltd.,
Singapore. (Council, 1924-1926; Hon. Sec.,
1925; Vice-President 1927).
1914. WYLEY, A. J., Lebong Donok, Benkoelen, Sumatra.
1923. WYNNE, M. L., Police Office, K. Lumpur.
1926. YAHYA BIN AHMAD AFIFI, 70, The Arcade, Singapore.
1923. †YATES, H. S., 1826 East Third Street, Long Beach,
California, U.S.A.
- 1917 †YATES, MAJOR W. G., West Kent Regiment, c/o Cox
& Co., 16, Charing Cross, London.
1920. †YEWDALL, CAPT. J. C., Sitiawan, Perak.
1927. YOUNG, C. G., Rubana Estate, Telok Anson, Perak.
1916. YOUNG, E. S., Caixa 1805, Sao Paulo, Brazil, S.
America.
1904. †YOUNG, H. S., Rosemount, Tain, Rosshire, England.
1920. ZAINAL ABIDIN BIN AHMAD, Sultan Idris Training
College, Tanjong Malim, Perak.
1927. ZUMSTEIN, R. B., Anglo Chinese School, Penang.

RULES
of
The Malayan Branch
of the
Royal Asiatic Society

I. Name and Objects.

1. The name of the Society shall be 'The Malayan Branch of the Royal Asiatic Society.'
2. The objects of the Society shall be:—
 - (a) The increase and diffusion of knowledge concerning British Malaya and the neighbouring countries.
 - (b) the publication of a Journal and of works and maps.
 - (c) the acquisition of books, maps and manuscripts.

II. Membership.

3. Members shall be of three kinds—Ordinary, Corresponding and Honorary.

4. Candidates for ordinary membership shall be proposed and seconded by members and elected by a majority of the Council

5. Ordinary members shall pay an annual subscription of \$5 *payable in advance on the first of January in each year.*

No member shall receive a copy of the Journal or other publications of the Society until his subscription for the current year has been paid.

Newly elected members shall be allowed to compound for life-membership for \$100; other members may compound by paying \$50, or \$100 less the amount already paid by them as ordinary members in annual subscriptions, whichever of these two sums is the greater. Societies and Institutions are eligible for ordinary membership.

6. On or about the 30th of June in each year the Honorary Treasurer shall prepare and submit to the Council a list of those members whose subscriptions for the current year remain unpaid. Such members shall be deemed to be suspended from membership until their subscriptions have been paid, and in default of payment within two years shall be deemed to have resigned their membership*

* **Bye-Law, 1922.** "Under Rule 6 Members who have failed to pay their subscription by the 30th June are suspended from membership until their subscriptions are paid. The issue of Journals published during that period of suspension cannot be guaranteed to members who have been so suspended."

7. Distinguished persons, and persons who have rendered notable service to the Society may on the recommendation of the Council be elected Honorary Members by a majority at a General meeting. Corresponding Members may, on the recommendation of two members of the Council, be elected by a majority of the Council, in recognition of services rendered to any scientific institution in British Malaya. They shall pay no subscription; they shall enjoy the privileges of members (except a vote at meetings and eligibility for office) and free receipt of the Society's publications.

III. Officers.

8. The officers of the Society shall be:—

A President.

Vice-Presidents not exceeding six, ordinarily two each from (i) the Straits Settlements, (ii) the Federated Malay States and (iii) the Unfederated or other Protected States, although this allocation shall in no way be binding on the electors.

An Honorary Treasurer.

An Honorary Secretary.

Five Councillors.

An Assistant Honorary Secretary.

These officers shall be elected for one year at the Annual General Meeting, and shall hold office until their successors are appointed.

9. Vacancies in the above offices occurring during any year shall be filled by a vote of the majority of the remaining officers.

IV. Council.

10. The Council of the Society shall be composed of the officers for the current year, and its duties and powers shall be:—

(a) to administer the affairs, property and trusts of the Society.

(b) to elect Ordinary and Corresponding Members and to recommend candidates for election as Honorary Members of the Society.

(c) to obtain and select material for publication in the Journal and to supervise the printing and distribution of the Journal.

(d) to authorise the publication of works and maps at the expense of the Society otherwise than in the Journal.

(e) to select and purchase books, maps and manuscripts for the Library.

(f) to accept or decline donations on behalf of the Society.

(g) to present to the Annual General Meeting at the expiration of their term of office a report of the proceedings and condition of the Society.

(b) to make and enforce by-laws and regulations for the proper conduct of the affairs of the Society. Every such bye-law or regulation shall be published in the Journal.

11. The Council shall meet for the transaction of business once a quarter and oftener if necessary. Three officers shall form a quorum of the Council.

V. General Meetings.

12. One week's notice of all meetings shall be given and of the subjects to be discussed or dealt with.

13. At all meetings the Chairman shall in the case of an equality of votes be entitled to a casting vote in addition to his own.

14. The Annual General Meeting shall be held in February in each year. Eleven members shall form a quorum.

15. (i) At the Annual General Meeting the Council shall present a report for the preceding year and the Treasurer shall render an account of the financial condition of the Society. Copies of such report and account shall be circulated to members with the notice calling the meeting.

(ii) Officers for the current year shall also be chosen.

16. The Council may summon a General Meeting at any time, and shall so summon one upon receipt by the Secretary of a written requisition signed by five ordinary members desiring to submit any specified resolution to such meeting. Seven members shall form a quorum at any such meeting.

17. Visitors may be admitted to any meeting at the discretion of the Chairman but shall not be allowed to address the meeting except by invitation of the Chairman.

VI. Publications.

18. The Journal shall be published at least twice in each year, and oftener if material is available. It shall contain material approved by the Council. In the first number of each volume shall be published the Report of the Council, the account of the financial position of the Society, a list of members and the Rules.

19. Every member shall be entitled to one copy of the Journal, which shall be sent free by post. Copies may be presented by the Council to other Societies or to distinguished individuals, and the remaining copies shall be sold at such prices as the Council shall from time to time direct.

20. Twenty-five copies of each paper published in the Journal shall be placed at the disposal of the author.

VII. Amendments of Rules.

21. Amendments to these Rules must be proposed in writing to the Council, who shall submit them to a General Meeting duly summoned to consider them. If passed at such General Meeting they shall come into force upon confirmation at a subsequent

Affiliation Privileges of Members.

Royal Asiatic Society. The Royal Asiatic Society has its headquarters at 74 Grosvenor Street, London, W., where it has a large library and collection of MSS. relating to oriental subjects, and holds monthly meetings from November to June (inclusive) at which papers on such subjects are read.

2. By Rule 105 of this Society all the Members of Branch Societies are entitled when on furlough or otherwise temporarily resident within Great Britain and Ireland, to the use of the Library as Non-Resident Members and to attend the ordinary monthly meetings of the Society. This Society accordingly invites Members of Branch Societies temporarily resident in Great Britain or Ireland to avail themselves of these facilities and to make their home addresses known to the Society so that notice of the meetings may be sent to them.

3. Under Rule 84, the Council of the Society is able to accept contributions to its Journal from Members of Branch Societies, and other persons interested in Oriental Research, of original articles, short notes, etc., on matters connected with the languages, archaeology, history, beliefs and customs of any part of Asia.

4. By virtue of the aforementioned Rule 105 all Members of Branch Societies are entitled to apply for election to the Society without the formality of nomination. They should apply in writing to the Secretary, stating their names and addresses, and mentioning the Branch Society to which they belong. Election is by the Society upon the recommendation of the Council.

5. The subscription for Non-Resident Members of the Society is 30/- per annum. They receive the quarterly journal post free.

Asiatic Society of Bengal. Members of the Malayan Branch of the Royal Asiatic Society, by a letter received in 1903, are accorded the privilege of admission to the monthly meetings of the Asiatic Society of Bengal, which are held usually at the Society's house, 1 Park Street, Calcutta.

Spolia Mentawiensia: Acridiidae (Orthoptera.)

by C. WILLEMSE

With an Introduction by C. BODEN KLOSS

(3 Plates and one text figure.)

- i Introduction.
- ii Systematic.
- iii Account of the Collection.

i. Introduction.

The Mentawi Group, to the west of Sumatra, consists of the islands of Siberut, Sipora, and North and South Pagi. The first and northernmost is larger than the other three (which are fairly equal in size) put together.

Except the Rhopalocera of Sipora scarcely anything was known of their entomology until I visited Siberut and Sipora during September—November 1924, accompanied by Mr. N. Smedley, Assistant Curator of the Raffles Museum, Singapore, and Dr. H. H. Karny, Assistant Entomologist, Zoological Museum, Buitenzorg, Java, with a party of native collectors. I have, as usual, to thank the Government of Netherlands India for the assistance and facilities afforded.

The islands are not very pleasant collecting grounds: they are mostly swamp out of which rise hills nowhere more than 1500 feet high and generally difficult to get at, being surrounded by soft ground. The sago palm is common. The native villages are situated on the banks of rivers some distance upstream, and there are scarcely any paths except those made by the Dutch military posts: these are generally through flat land and are often untraversable owing to floods. There is much rain throughout the year. The islands are unhealthy: in spite of systematic employment of quinine and other precautions, all the members of a party of fifteen, except myself, suffered from malaria either on the islands or soon after leaving them.

The group lies parallel to the west coast of Sumatra and about 60—80 miles distant. Siberut is about seventy miles long and about thirty broad, and its northern extremity is on Lat. 1° South.

The islands are apparently connected with each other by a sea-bottom of less than 100 fathoms, and most bathygraphical charts show a connection with Sumatra, via the Batu Islands to the north-east, by a narrow ridge of similar soundings; but I am inclined to doubt that this ridge is unbroken as indicated, for the faunas of the groups differ greatly, while, though the Mentawi

Islands possess a much richer mammalian fauna than the undoubtedly deep-water islands of Simalur and Engano at the extremities of the West Sumatran chain of islands, the fauna is much more peculiar and differentiated than that of Nias Island, also represented as being within the one hundred fathom line. Whatever the depths may be, they certainly are not those of the shallow Sunda shelf (less than 40 fathoms) on which stand almost all the land-masses of Malaysia, i.e., the Peninsula, Sumatra, Java, Bali, Borneo, etc.

Apart from the doubtful connecting ridge the group is surrounded by depths of 100—500 fathoms of water; further everywhere directly between it and Sumatra lies the long Mentawi Basin with depths of 500—1000 fathoms. Such conditions render several of the West Sumatran Islands, in spite of small size and lack of height, zoologically quite as distinct from each other and from the rest of Malaysia as the larger areas of that sub-region are from each other.

The islands are forested all over, and our material was obtained from varied localities near the Government stations of Siberut, in the island of that name, and Sioban in Sipora: it came from the sea-shore, low-lying ground, the swamps, cultivated areas, and from such hills as were accessible.

During the journey to and from the islands we also made small collections of insects at Padang, West Sumatra; on Pulau Tello, one of the shallow-water Batu Group to the north of Siberut; and on the Pagi Islands where Dr. Karny spent several days.

As reports on the various collections obtained are prepared they will be published in various journals under the general title "*Spolia Mentawiensia*."

The following have appeared to date:—

- Spolia Mentawiensia*: Flora. H. N. Ridley, Kew Bulletin of Miscellaneous Information, No. 2, 1926, pp. 56—94.
- Spolia Mentawiensia*: Birds. F.N. Chasen and C. Boden Kloss, Ibis, April 1926, pp. 269—305. Plate III and fig. 10.
- Spolia Mentawiensia*: Three new birds from the Mentawi Islands. J. H. Riley, Proc. Biol. Soc. Wash., 40, 1927 pp. 95—96.
- Spolia Mentawiensia*: Reptiles and Amphibians. Malcolm A. Smith, Ann. Mag. Nat. Hist., (9), XVIII, 1926, p. 76.
- Spolia Mentawiensia*: Zoraptera. H. H. Karny, Treubia, IX, 1926, pp. 1—5.
- Spolia Mentawiensia*: Dragonflies (Odonata). F. F. Laidlaw, Journ. Mal. Br. Roy. Asiatic Soc., IV, 1926, pp. 214—233.
- Spolia Mentawiensia*: Dermaptera. Alfredo Borelli, *tom. cit.* pp. 384—391.

Spolia Mentawiensia: Fulgoroidea. F. Muir, *tom. cit.* pp. 392—412.

Spolia Mentawiensia: Fulgoroidea. C. F. Baker, Philippine Journ. Science, 32, 1927 pp. 391—410.

Spolia Mentawiensia: Mantidae. F. Werner, Treubia, IX, 1927, pp. 413—419.

ii. Systematic.

Phaestus sumatrensis nov. sp. Type: Sumatra, Bah Lias ♂, ♀.

Paramitraria nov. gen. Type: *P. gracilis*.

Paramitraria gracilis nov. sp. Type: Siberut Id. ♂.

Valanga nigricornis insularis nov. subsp. Type: Sipora Id. ♀.

Traulia insularis nov. sp. Type: Sipora Id. ♂, ♀.

Traulia flava nov. sp. Type: Siberut Id. ♂.

Traulia aphanes nov. sp. Type: Pulau Tello, Batu Islands ♂.

Paratraulia grandiceps nov. sp. Type: Siberut Id. ♀.

Bibracte rotundata nov. sp. Type: Sipora Id. ♂.

iii. Report on the Collection.

[The initials given with localities in the list of specimens in each case refer to the collectors: C. B. K(loss), N. S(medley) and H. H. K(arry)]

Subfam. Tetriginæ.

Sect. DISCOTETTIGIÆ.

1. **Phaestus sumatrensis** nov. sp.

Type ♂. This species differs from the only known species (*P. mellerborgi* Stal) by the following characters.

General coloration dull blackish-brown or greyish-brown, sometimes pale variegated.

Antennal joints blackish-brown, greyish-brown or dirty-yellowish, apical joint yellowish-white.

Hind femora brown or greyish-brown, the *area infero-externa* dark brown or black.

Pronotum posteriorly extended a little beyond the knees of the hind femora, especially in the ♂.

Wings somewhat longer than the pronotum.

Superior carinae of femora finely granulate or serrulate.

Entire length of body. ♂ 8-9 mm., ♀ 8.5-10 mm.
antennae ♂ 6 mm., ♀ 5 mm.; pronotum, ♂ 8-12 mm., ♀ 9 mm.,
posterior femora ♂ 4.5-5 mm., ♀ 5 mm.

Locality: Sumatra, Bah Lias, 19.11.1919. ♂ type (coll. Corporaal) Idem ♀ ♀.

Pt. 1, 1928] *Royal Asiatic Society*.

Other specimens examined. Sumatra: Lou Rakit (coll. Corporaal); Fort de Koek; Buo, Padang lowlands; Muara-Kiawai (coll. E. Jacobson). West Sumatra Islands: Pulau Babi, or Simalur; Siberut (C.B.K. & N.S., H.H.K, Sept. 1924); Sipora (C.B.K. & N. S., H.H.K., Oct. 1924)

This new species was formerly described by me from a specimen belonging to the collection of J. B. Corporaal, but the paper is still in manuscript. I take the opportunity of publishing the description here.

Sect. *SCELIMENAE*.

2. *Acanthalobus saginatus* Bol.

Siberut Id. (C.B.K. & N.S., Sept. 1924)

3. *Falconius gestroi* Bol.

Siberut Id. (C.B.K. & N.S., Sept. 1924); Sipora Id. (C.B.K. & N.S., Oct. 1924).

Sect. *METRODORAE*.

4. *Xistra tricristata* Bol. var. *sumatrana* Bol.

Siberut Id. (C.B.K. & N.S., Sept. 1924); Sipora Id. (C.B.K. & N.S., Oct. 1924).

Genus *Paramitraria* nov. gen.

Body finely granulose. Face moderately oblique; antennae inserted distinctly below the eyes, slender, strongly elongate, composed of 9—10 joints; posterior ocelli placed between the middle of the eyes, vertex strongly produced forward in front of the eyes to the distance equal to about one and a half of the length of one of them, excavated above, acute, the apex pointed, margins entire, median carina distinct.

Eyes globose, conspicuously exerted.

Pronotum anteriorly truncate, posteriorly elongate acuminate and projecting greatly beyond the abdomen; dorsum flattened, the median carina percurrent but little elevated; humeral angles rounded; the posterior angles of the lateral lobes moderately outwardly prominent and obtuse. Elytra small and oblong; wings perfectly developed, as long as the pronotum.

Femora slightly compressed, the superior carinae acute in the anterior legs, somewhat laminate in the median and posterior legs; the genicular spine distinct and acute in the median and posterior legs; femoral lobe of posterior legs distinct and acute.

Tibiae sulcate above; the margins of the anterior tibiae serrate in the apical half; posterior tibiae towards the apices not or scarcely ampliate, margins serrate.

The first joint of the posterior tarsi nearly equal in length to the third.

This genus is nearly allied to *Mitraria* Bol., and *Pseudomitraria* Hancock, and differs in the following points.

From *Mitraria* in having the antennae inserted distinctly below the eyes, strongly elongate and reaching as far as the middle of the hind femora (*Mitraria* reaching to the elytra) in the margins of the produced vertex entire, in the strong developed genicular spine and femoral lobe of the posterior legs; from *Pseudomitrraria* in the same points and in the first joint of the posterior tarsi nearly equal in length to the third.

Genotype. *Paramitraria gracilis* ♂.

5. ***Paramitraria gracilis* nov. sp.** (Figs. 1, 2).

♂ ferruginous or brown, the tarsi of the anterior and median legs, the tip of the posterior tibiae black.

Elytra with a black spot in the middle.

Entire length of body, 17 mm.; antennae, 7 mm.; pronotum, 13.5 mm.; posterior femora, 6.5 mm.

Siberut Id. (C.B.K. & N. S., 1 ♂, Sept. 1924. Type).

Sect. TETTIGIAE.

6. ***Coptotettix modigliani* Bol.**

Sipora Id. (C.B.K. & N.S., Oct. 1924).

Subfam. **Eumastacinae.**

7. ***Choroetypus* sp.**

Siberut Id. (H.H.K. 30.9.1924: ♀ larva).

8. ***Erucius* sp.**

Siberut Id. (H.H.K. 28.9.1924): South Pagi Id (H.H.K. 17.10.1924).

I abstain from naming these specimens in consideration of a forthcoming monograph of the whole subfamily *Eumastacinae* by Dr. C. Bolivar.

9. ***Mnesicles strigatus* Bol.**

Siberut Id. (H.H.K. 9.9.1924)

The dimensions of this female are:—

Length of body, 27mm.; length of pronotum, 5 mm.; length of elytra, 18.5 mm.; length of hind femora, 19 mm.

Subfam. **Tryxalinae.**

10. ***Phlaeoba antennata* Br. v. W.**

Siberut Id. (C.B.K. & N.S., H.H.K. Sept. 1924)

11. ***Aiolopus tamulus* Fabr.**

Siberut Id. (C.B.K. & N.S., H.H.K. Sept. & Oct. 1924)

Sipora Id. (H.H.K., 11.10.1924).

Subfam. **Pyrgomorphinae.**

12. ***Atractomorpha psittacina* de Haan**

Siberut Id. (C.B.K. & N.S., H.H.K., Sept. 1924), Sipora Id. (H.H.K. 12.10.1924).

13. *Atractomorpha similis* Bol.

Pulau Tello, Batu Islands (C.B.K. & N.S., Oct. 1924), North Pagi Id. (C.B.K. & N.S., Oct. 1924).

14. *Systella* sp. nov.

Siberut Id. (H.H.K. 22.9.1924).

This will be described in a monograph on the genus which I have in preparation.

Subfam. *Catantopinae*.15. *Oxya sinensis* Walk.

Siberut Id. (C.B.K. & N.S., H.H.K., Sept. 1924), Sipora Id. (C.B.K. & N.S., H.H.K. Oct. 1924).

16. *Patanga luteicornis* Serv.

Siberut Id. (C. B. K. & N. S., Oct. 1924), Sipora Id. (C.B.K. & N.S., Oct. 1924).

17. *Valanga nigricornis* Burm. subsp. *insularis* nov.

This subspecies is closely related to the type (*V. nigricornis nigricornis* Burm.), but differs in the median keel of the pronotum being moderately sharp, the general coloration brown, the black markings on the pronotum, especially in the ♀, being well developed (in the ♂ more faintly marked); the hind femora with the carinae and carinulae black; or blackish blue hind tibiae from above bluish-black except the tip which is reddish (♀), the spines being yellow with black tips. Genicular lobes yellow.

The wings are moderately infumate.

Length of body, ♂ 43, ♀ 60, mm.; pronotum, ♂ 10, ♀ 14 mm.; elytra, ♂ 40, ♀ 56 mm.; hind femur, ♂ 25, ♀ 32 mm.

Described from 1 ♀ type from Sipora Island (C.B.K. & N.S.; Oct. 1924) and 1 ♂ that also probably belongs to this subspecies from Pulau Tello, Batu Islands (C.B.K. & N.S., Nov. 1924).

Siberut Id. H.H.K., Oct. 1924).

18. *Traulia insularis* nov. sp. (Fig. 3).

Type ♂. Coloration black, with brown and yellow bands or stripes. Antennae reddish-brown, darker apically, the apex yellow. Occiput brown, fastigium sometimes lighter.

A transverse yellow band runs from the lower part of the front, across the genae backwards, along the lower part of the lateral lobes and on to the epipleura of the mesothorax.

The upper part of the front dirty-white with black spots, or black.

Frontal ridge near the clypeus with two black stripes or quadrangular black spot. Mouthparts brown with yellow spots, the palpi yellow.

Disk of pronotum reddish-brown, the sides bordered with a narrow yellow stripe which runs along on the tegmina.

The upper part of the lateral lobes black, the lower part yellow. Anterior margin rounded, with a slight incurving in the middle, posterior margin truncate, subrounded or with a little incision in the middle.

Epimera of meso-and metathorax yellow. Tegmina short, oval, lateral, reaching as far as the hind margin of the second segment of the abdomen; black, the anal vein yellowish, the *area analis* brown.

Sternum black, meso-and metasternum with a yellow spot in the middle, metasternum also with a yellow spot near the hind margin which is yellow bordered.

Abdomen brown, with a dirty-yellow stripe above and a yellow stripe along the sides, the hind margin of the segments and a median spot on each sternite yellow.

Anterior and median legs olive brown. Femora of posterior legs green, the under surface lighter, sometimes a little blackish spot at the base on the outer side. Knees black. Hind tibiae in the basal half green, in the apical half darker or extreme tip more brownish-green. Spines yellowish-brown with black tips. Hind tarsi brown.

	♂	♀
Length of body	18.5 mm.	26 mm.
" " antennae	12.5 mm.	?
" " pronotum	4.5 mm.	6.5 mm.
" " elytra	3.5 mm.	5.5 mm.
" " hind femora	12 mm.	15 mm.

Sipora Id. (C.B.K. & N.S., Oct. 1924, 1 ♂ type; 1 ♀ idem; 2 ♂♂, 1 ♀ cotypes), Sipora Id. (H.H.K. 12.10.1924), Siberut Id. (C.B.K. & N.S., Sept. 1924), North and South Pagi Islands (H.H.K., Oct. 1924).

19. **Traulia flava**, nov. sp.¹ (Fig. 4)

Type ♂. Coloration black or dark brown.

Antennae reddish-brown or dark brown, darker apically, the basal joint with a yellow spot from above, the apex yellow. Occiput dark brown, fastigium yellowish, the central sulcus with a brown stripe and brown spots.

A transverse yellow band runs from the lower part of the front, across the genae backwards, along the lower part of the lateral lobes on to the epimera of the mesothorax. Frontal ridge near the clypeus with a black quadrangular spot (♂) or with two black stripes (♀). Mouthparts black, the palpi yellow. Disk of pronotum yellow or reddish-yellow, sulci and a faint spot near the anterior margin tinged with faint brown, sometimes with an indication of a narrow yellow stripe along the sides (♀).

1. It is very probable that *flava* is but a colour variation of *insularis*. I can find no structural difference of any importance.

Anterior margin rounded, with a rounded incision in the middle; posterior margin truncated with a incision in the middle.

Lateral lobes of pronotum dark brown or black, the lower margin with a yellow band sometimes with a little brown stripe in the middle.

Epimera of meso-and metathorax yellow.

Tegmina black, with a yellow stripe along the *vena analis*, *area analis* brown; oval, lateral, extending as far as the hind margin of the second segment of the abdomen. The apex of the tegmina broad and subrounded.

Sternum black, meso-and metasternum with a yellow spot in the middle, metasternum also with a yellow spot near the hind margin which is yellow bordered.

Abdomen brown castaneous, the terminal segments lighter brown; the margins of the tergites and sternites yellow bordered.

Dorsal segments with a median yellow stripe, and one along the side, ventral ones with a median yellow spot, in the ♀ more uniform brown.

Anterior and median legs reddish-brown, or olive green, femora more greenish. Femora of posterior legs green, the under surface lighter, a little black spot at the base on the outer side, with a faint sometimes indication of a small yellow ring at the apex; knees black; hind tibiae reddish-brown or dark olive, with a pale or greenish praegenicular ring; spines dirty-yellow with black tips.

Hind tarsi dark brown, the apices of the joints more pale brown.

	♂	♀
Length of body	19 mm.	24 mm.
" " antennae	12 mm.	13 mm.
" " pronotum	5 mm.	5.5 mm.
" " elytra	4 mm.	5 mm.
" " hind femora	12.5 mm.	15 mm.

Siberut Id. (C.B.K. & N.S., Sept. 1924, 1 ♂ type), Siberut Id. (H.H.K., Oct. 1924).

20. ***Traulia aphanea*** nov. sp. (Fig. 5).

Type ♂. Coloration brown ochraceous with a broad band along the side.

Antennae blackish-brown, the apex yellowish-brown. The face brownish-ochraceous, the upper part black, with a broad black band extending from the upper part, along the under margin of the eye to the hind margin of the lateral pronotal lobes. Frontal ridge near the clypeus with a black spot. Mouth-parts black, the palpi brownish.

Pronotum entirely brownish-ochraceous, only with the black band in the superior part of the lateral lobes.

Pleurae black, except the epimera of meso-and metathorax which are brownish-ochraceous.

Tegmina short, not reaching the apex of the abdomen.

Elytra narrow, with the apex rounded; black, except the *area analis* which is brownish-ochraceous.

Abdomen brown with a row of black spots one on each side of each segment.

Anterior and median legs brown, with a blackish spot at the articulations.

Femora of posterior legs black, except the *area superior* and a small stripe along the *carinula ext.-inferior* which are brown-ochraceous and a praegenicular yellow ring.

Hind tibiae black with a yellow ring near the base, the apex brownish, spines black. Hind tarsi brown.

	♂
Length of body	20 mm.
" " antennae	11 mm.
" " pronotum	5 mm.
" " elytra	9.5 mm.
" " hind femora	11 mm.

Pulau Tello, Batu Islands (C.B.K. & N.S., Nov. 1924, 1 ♂ type).

21. **Paratraulia grandiceps** nov. sp. (Fig. 6)

Type ♀. Coloration olive green with black and yellow bands.

Antennae blackish-brown, the basal joints reddish except the first 4—5 joints which are dark olive green; the extreme tip yellowish.

The face blackish-brown or olive green; vertex dark olive, with a yellow stripe extending from the upper margin of the eye and bordering the sides of the pronotum.

Cheeks yellow or yellowish-green. A wide black stripe runs behind each eye covering the upper part of the sides of the pronotum as far as the epimerum of the mesothorax.

Mouthparts big, brown, the palpi yellowish-brown.

Pronotum olive green, with a yellow line on each side of the disc; the lateral lobes in the superior part black, the inferior part yellow, sometimes with a blackish spot or stripe in the middle of the lower margin.

Pleurae black, the epimera of meso-and metathorax with a yellow stripe.

Elytra not extending beyond the apex of the abdomen, blackish-brown, the *area analis* greenish-yellow and a stripe along the anal vein yellow.

Wings sub-cycloid, smoky-hyaline tinged towards the base with pale blue.

Abdomen brown castaneous, from above with a yellow stripe along each side, ventral segments yellowish green.

Anterior and median legs brown or olive green. Femora of posterior legs green, the inner surface and the base more yellowish, knees dark brown or olive.

Hind tibiae black or dark olive or olive green at the base, spines yellowish with black tips. Hind tarsi yellowish brown or olive green. Cercus yellow or olive-green.

	♂	♀
Length of body	23-25 mm.	27 mm.
" " antennae	13-14 mm.	10 mm.
" " pronotum	5.5-6 mm.	6.5 mm.
" " elytra	15-16 mm.	17 mm.
" " wings	15-15.5 mm.	16.5 mm.
" " hind femora	13-14 mm.	17 mm.

Siberut Id. (H.B.K. & N.S., Sept. 1924, 1 ♀ type), Siberut Id. (H.H.K., Oct. 1924), South Pagi Id. (H.H.K., Oct. 1924).

22. **Lucretilis antennata** Bol.

General coloration yellowish-green with stripes of olive green.

Antennae black, except the basal joints which are greenish.

Face and cheeks yellowish green.

Occiput and vertex dark olive green or brownish, with two yellow spots near the eye; fastigium yellowish with the foremargin green.

Fascia oculo-pronotica super. dark olive green.

Pronotum yellowish-green, with a broad median fascia and the upper part of the lateral lobes dark olive green.

Elytra yellowish green; *area mediastina* and *analis* green the tip of the *area mediastina* more blackish-brown.

Anterior and median legs dirty yellow or greenish.

Hind femora yellowish-green, near the top and the *area infero-interna* greenish-blue, the knee reddish-brown.

Hind tibiae greenish-blue, spines with black tips; the extreme top near the spurs reddish-brown, spurs reddish-brown with black tips.

Hind tarsi greenish-blue.

Abdomen dark olive, with yellow spots and stripes from above and along the sides.

	♂	♀
Length of body	22 mm.	27 mm.
" " pronotum	5 mm.	6.5 mm.
" " elytra	9 mm.	9.5 mm.
" " hind femora	13 mm.	16.5 mm.

Siberut Id. [H.H.K., 8 IX. 1924, 1 ♂, 1 ♀].

The type of *L. antennata* is a specimen in alcohol, much discoloured.

23. ***Bibracte rotundata*** nov. sp.

General coloration brown. Antennae blackish brown, the basal joints brown.

Pronotum brown, the principal sulcus on the disc black.

Elytra brown, nearly reaching the apex of hind femora, broad, broadly rounded at the apex. Wings smoky, as long as elytra. Anterior and median legs brownish-green.

Hind femora brownish-green, especially the *area superior*, knees brownish-black. Hind tibiae bluish-green, spines black. Hind tarsi brownish.

♂. Supra-anal plate long, triangular, apex acutangular; with a median sulcus running to the apex.

Cerci as long as the supra-anal plate, straight, conical, apex pointed.

Subgenital plate recurved, apex more or less pointed.

	♂
Length of body	28.5 mm.
" " pronotum	7 mm.
" " elytra	21 mm.
" " hind femora	18 mm.

Sipora Id. (H.H.K. 12.10.1924, No. 174, 1 ♂), Siberut Id. (H.H.K., 17.9.1924, No. 60, 1 ♂).

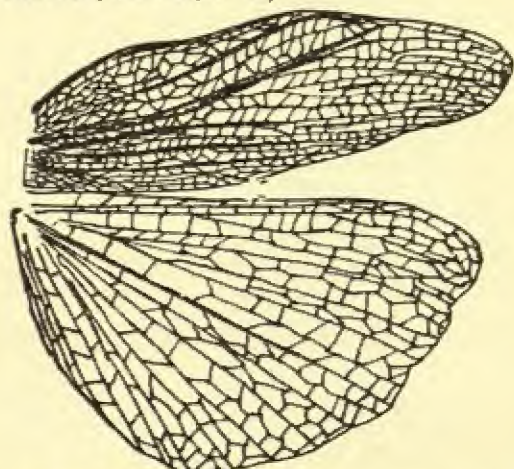


Fig. I. *Bibracte rotundata* nov. sp. Elytra and wing.

24. ***Catantops splendens*** Thunb.

Siberut Id. (C.B.K. & N.S., H.H.K., Sept. 1924).

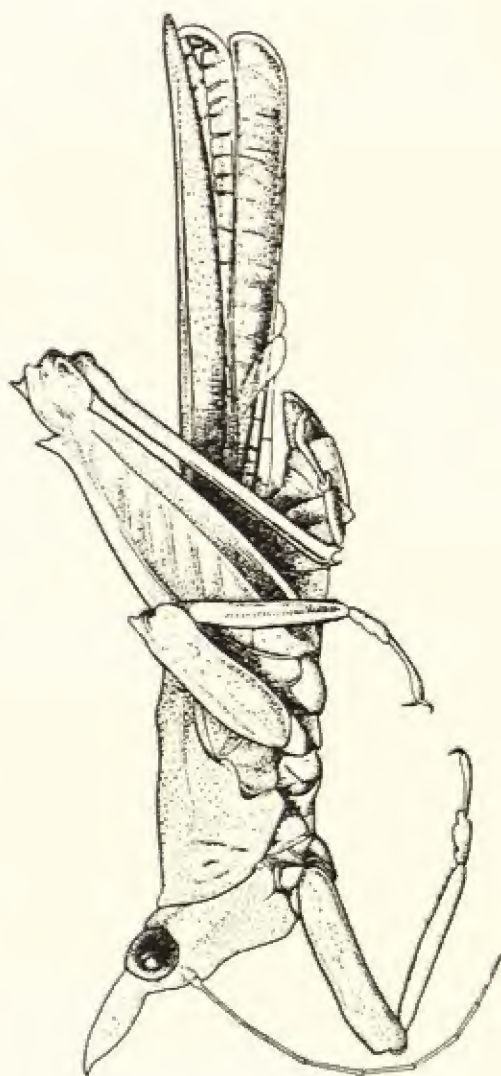
The commonest species met with.

Explanation of the Plates

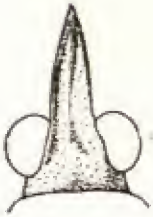
- Plate 1. *Paramitraria gracilis* gen. & sp. n.
Plate 2, Fig. 2. do. do. ; head from above.
Fig. 3. *Traulia insularis* sp. n.
Fig. 4. „ *flava* sp. n.
Fig. 5. „ *aphanea* sp. n.
Fig. 6. *Paratraulia grandiceps* sp. n.

The figures in Pl. 1 and Pl. 2, fig. 2, are magnified 8 times, all others 6 times.

- Plate 3, Fig. 1. *Lucretilis antennata* Bol.
Fig. 2. *Valanga nigricornis insularis* subsp. n.
Fig. 3. *Bibracte rotundata* sp. n.



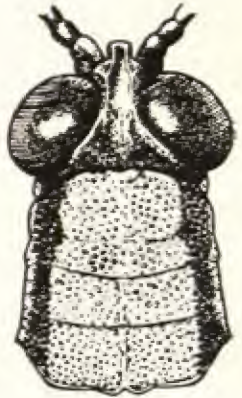




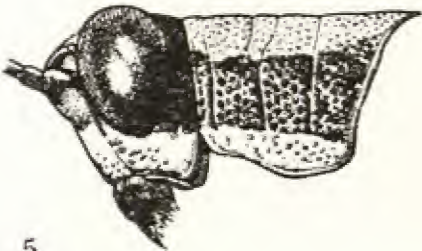
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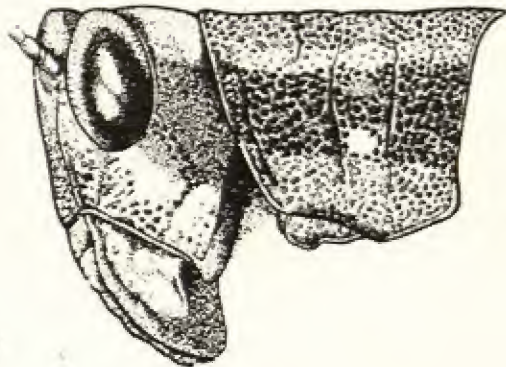
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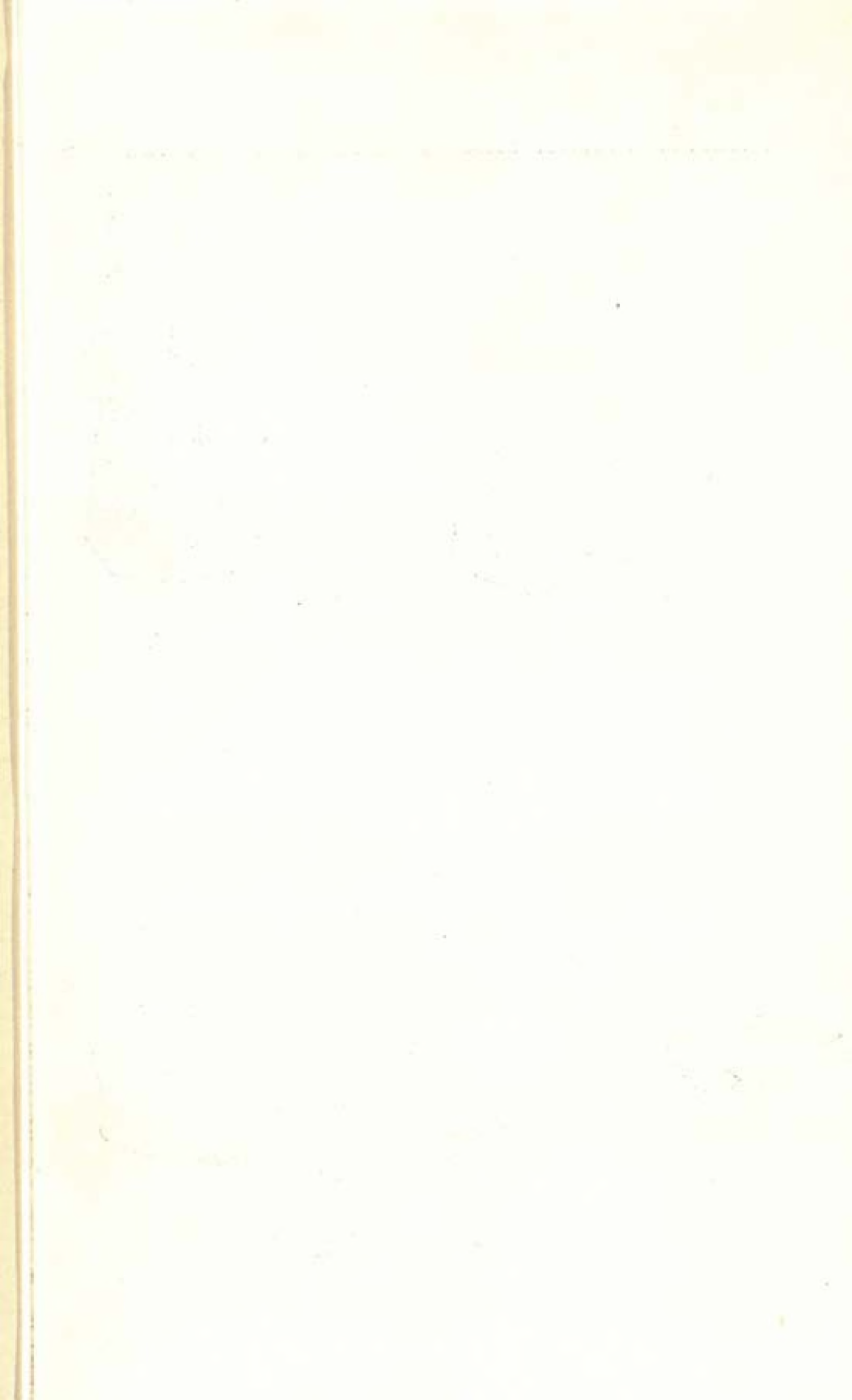
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Spolia Mentawiensia: Membracidae, Homoptera.

By W. D. FUNKHOUSER.

[During the visit undertaken by the Raffles Museum, Singapore, in Sept.—Nov. 1924, to the little-known Mentawi Group off the West Coast of Sumatra, which comprises the islands of Siberut, Sipora, North and South Pagi, I was accompanied by Mr. N. Smedley, Assistant Curator of the Raffles Museum, and Dr. H. H. Karny, Assistant Entomologist of the Buitenzorg Museum, Java, and we obtained good series of Homoptera, but very few Membracids were among them and Dr. Karny is responsible for the majority of the specimens of this family secured.

I am indebted to Dr. Funkhouser for the following determinations and description. C. Boden Kloss].

1. *Leptocentrus reponens* Walker

1 ♂ Sipora. Oct. 1924, C.B.K. & N.S.

1 ♀ do. 11. x. 24, H.H.K.

2. *Anchonoides sordidus* sp. nov.

Near *A. variegatus* Funkhouser, but differing in color and with the tegmina entirely opaque and coriaceous. Very dark and brown, nearly black; suprahumeral swollen at base; posterior process distinctly sinuate, extending beyond internal angles of tegmina.

Head longer than broad, sculptured, indistinctly punctate, sparingly pubescent, very dark brown; base sinuate; eyes large, brown, extending beyond lateral margins of pronotum but not as far as humeral angles; ocelli prominent, brown, about equidistant from each other and from the eyes and situated on a line drawn through centres of eyes; clypeus twice as long as broad, constricted in centre, sparingly pilose.

Pronotum dark brown, roughly sculptured, faintly punctate, sparingly pubescent; median carina percurrent; humeral angles prominent, blunt; suprahumeral horns about as long as their width at base, projecting almost directly outwards, extending a little beyond humeral angles, base swollen, tips suddenly acuminate; metopidium about as high as broad, convex in front, almost vertical above the head; posterior process long, sinuate, elevated above the scutellum, then bending to touch tegmina, then rising in a curve, then depressed to the acute tip which extends beyond the internal angles of the tegmina.

Tegmina entirely coriaceous and opaque; base black and punctate; median part mottled brown and black; tip brown, pointed; veins distinct, dark brown, slightly pilose.

Abdomen and undersurface of body uniformly dark brown; legs dark brown with a broad band of ferruginous across the middle of each tibia; tarsi ferruginous; claws black.

Length to tips of tegmina 6 mm.; width between tips of suprahumeral 2.8 mm.

Type: male.

Locality: Siberut Island, West Sumatra. (Sept. 1924. C.B.K. & N.S.).

Type in collection of Raffles Museum, Singapore.

3. **Gargara attenuata** Funkhouser
2 ex. Siberut. 9. IX. 24, H.H.K.
1 ex. Sipora. 25. X. 24, H.H.K.
4. **Gargara sordida** Funkh.
1 ex. Sipora. 28. X. 24, H.H.K.
5. **Sipylus dilatatus** Walk.
1 ex. Sipora. 28. X. 24, H.H.K.
1 ex. no data. H.H.K.

Spolia Mentawiensia: Pteridophyta

By R. E. HOLTUM, M.A.

The flowering plants collected by Mr. C. Boden Kloss during his expedition to the Mentawi Islands in 1924 have already been enumerated by Mr. H. N. Ridley (*Kew Bulletin*, No. 2, 1926; see also *Journ. Malayan Branch, R.A.S.*, IV, 1926, pp. 167-170). The Pteridophytes from the same collection are here dealt with, and in addition those obtained by a collector from the Buitenzorg-Gardens attached to the expedition. The numbers of Mr. Kloss' specimens are in the Singapore Gardens field series; those of the Buitenzorg collector, Iboet, are in a separate series for the expedition. I am greatly indebted to the Director of the Buitenzorg Gardens for permitting me to examine the latter specimens, and for allowing me free access to the fern collections in the Buitenzorg herbarium.

Journal Malayan Branch [Vol. VI,

Ferns were obtained on both the islands Siberut and Sipora, the greater number from the former. Of 77 species in the whole collection, 59 were found in Siberut, and 29 in Sipora. The majority of the species are of wide distribution in the Malaysian area. It is probable that they do not represent a very complete record of the pteridophyte flora, certain universal species, e.g. *Gleichenia linearis*, being absent. There are a few species however of considerable interest, notably a remarkable *Alsophila* and a *Polypodium* which are believed to be new. Further, the known range of *Trichomanes aphlebioides* and *Lygodium borneense* is considerably increased by this collection, and other new facts concerning these species brought to light.

The nomenclature used for the ferns is that of Christensen's *Index Filicum*. The writer regrets that he is unable to identify some of the Selaginellas.

PSILOTALES.

Psilotum complanatum Sw.

Siberut: Kloss 14588. Iboet 288, in jungle, epiphyte.

LYCOPODIALES.

Lycopodium cernuum L.

Siberut: Kloss 10588. Iboet 188, edge of jungle.

Sipora: Iboet 462, in jungle.

Lycopodium laxum Spr.

Siberut: Kloss 14557.

Lycopodium nummulariifolium Bl.

Siberut: Kloss 10581. Iboet 289, on tree in jungle.

Lycopodium phlegmaria L.

Siberut: Kloss 11447. Iboet 179, 278, on trees in jungle.

Lycopodium squarrosum Forst.

Siberut: Kloss 14509, 14540. Iboet 256, on tree in jungle.

Selaginella nutans Warb. var. *grandiscapia* v.A.v.R.

Siberut: Kloss 14073. Iboet 100, by water. Native name,

Takep toeloe.

Sipora: Kloss 14660. Iboet 443.

Pagi: Kloss 14635.

[Pt. I, 1928] *Royal Asiatic Society*.

Selaginella sp.

Siberut: Kloss 14573. Iboet 309.

Selaginella sp.

Sipora: Kloss 14732.

Selaginella sp.

Sipora: Iboet 477.

FILICALES.***Ophioglossaceae*****Helminthostachys zeylanica** (L.) Hk.

Siberut: Kloss 14465.

Ophioglossum pendulum L.

Siberut: Kloss 14518. Iboet 129, in jungle, epiphyte.

Marattiaceae**Christensenia aesculifolia** (Bl.) Maxon.

Siberut: Iboet 352, in jungle, near stream.

Schizaeaceae**Lygodium borneense** v. A. v. R.

Siberut: Kloss 14469.

This collection and others of recent date from Borneo in the Buitenzorg Herbarium add materially to our knowledge of *L. borneense*. The specimens at present known are:

West Borneo: Teysmann.

East Borneo: Samarinda, Rutten 40 (forma samarindae).
between Moeara Uja and Kundim Baru, Winkler 2722.

Moeara Antjaloeng, 15 m., Endert 2057; common,
in secondary and primary forest.

Kombeng, 30 m., Endert 5191; low country, in
primary forest.

B. N. Borneo: Sandakan, Elmer 20198 (1921). Distributed as
Lygodium Elmeri Merrill.

The species was first described (Bull. Jard. Bot. Buitenzorg, Series, 2, XX, 29) from the first two specimens quoted. In these, the "secondary petioles" (arising on opposite sides of the "primary petioles," which are the very short branches arising laterally on the main rachis) are once forked, the two branches each bearing a simple leaflet. While most of the branchings of the Mentawi fronds are of this nature, several have only one leaflet on each secondary petiole; this condition is also shown exclusively on Elmer's specimen distributed to Singapore. Further, in Endert's 5191 some of the secondary petioles have one or both of the branches forked again, each ultimate branch bearing a simple

leaflet. In general, the leaflets are largest where they are borne singly on the secondary petioles, but there is much variation, even in a single frond, and no sharp line can be drawn between van Alderwerelt's forma typica and forma samarindae.

The species appears to be common in Borneo, and it is remarkable that it has not hitherto been collected in the lowlands of Sumatra or the Malay Peninsula. Its smaller forms might at a glance be mistaken for *L. circinnatum*, and it has perhaps been overlooked on this account.



Lygodium borneense. A "primary petiole" with its two "secondary petioles," one bearing a single leaflet, the other two leaflets. Nat size.

***Lygodium circinnatum* (Burm.) Sw.**

Siberut: Kloss 13073. Iboet 61, edge of jungle. Native name Alalai.

Sipora: Kloss 14787. Iboet 380, edge of jungle. Native name Rapit.

***Schizaea dichotoma* (L.) Sm.**

Siberut: Kloss 11448. Iboet 108, in jungle, abundant. These specimens are both small and little branched.

Gleicheniaceae

***Gleichenia laevigata* (Willd.) Hk.**

Siberut: Iboet 131.

Hymenophyllaceae

***Hymenophyllum acanthoides* (v. d. B.) Rst.**

Siberut: Kloss 14605.

Pt. 1, 1928] *Royal Asiatic Society*.

Hymenophyllum Blumeanum Spr.

Siberut: Kloss 14604, on tree trunk. Iboet 130, in jungle.

The fronds of both these specimens are very small and freely soriferous, drying reddish in colour; in 14604 the pinnae are so close in many cases that they overlap. The form of the pinnae and of the sori is however so close to that of *H. Blumeanum* (the narrow form, common in the Malay Peninsula) that I cannot separate them. It is likely that the fern was found growing in rather an exposed place; this would account for its dwarfing and numerous sori, and possibly for the red colour also. This suggestion is supported by the fact that 14604 grew on a thick cushion of *Leucophanes* sp.; species of this genus usually occur, in the writer's experience, in somewhat exposed spots. The sponge-like nature of the moss cushion would afford a supply of water to the fern. Iboet's 130 seems to have grown on rotten bark; it has larger fronds, the longest of which, 5 cm. in length, agree well with the smallest specimens of *H. Blumeanum* from the Malay Peninsula.

Hymenophyllum denticulatum Sw.

Siberut: Iboet 116, sterile, perhaps belongs to this species.

Hymenophyllum sp.

Sipora: Iboet 498, on rotten trunk in jungle. This is sterile; it belongs to the group of *H. aculeatum*.

Trichomanes aphlebioides Christ.

Siberut: Kloss 14516. Iboet 195, in jungle, epiphyte.

Sipora: Kloss 14831.

This species was first described from New Guinea. The Mentawai ferns agree closely with the original collection of Lauterbach (no. 494, named *T. tenuissimum* Chr.) but are perhaps of a somewhat finer texture. The aphlebiae are very well developed. They originate in the axils of the normal fronds and are copiously branched; the largest observed is 11 cm. in length. Their main branches are distinctly winged (as are the stipes of the normal fronds), and even the smallest segments appear to have a very narrow wing, so that, at least when dry, they are not quite circular in section.

In the herbarium at Buitenzorg is a specimen from Ternate; and in the Singapore herbarium is one from Gunong Panti, Johore (Ridley 4147) bearing numerous aphlebiae. The species doubtless occurs in Sumatra and elsewhere; isolated fronds may perhaps have been confused with other species.

Trichomanes bilabiatum Nees and Bl.

Siberut: Iboet 70, in jungle, epiphyte. Native name Soesoe matta.

Trichomanes cupressoides Desv.

Siberut: Kloss 11432.

Trichomanes javanicum Bl.

This species has been split by various authors. The following specimens may not all belong to it in the strict sense, but I do not know the group sufficiently well to be able to subdivide them.

Siberut: Kloss 14600. Iboet 47 (small immature plants; pinnae much divided). Iboet 119, by edge of water.

Sipora: Kloss 14820. Iboet 506.

Trichomanes millefolium Pr.

Siberut: Iboet 99, by edge of water. Native name Kasosom.

Cyatheaceae**Alsophila latebrosa** Wall.

Sipora: Kloss 14829.

Alsophila parvifolia n. sp.

Siberut: Kloss 14579.

Sipora: Iboet 554, in jungle, terrestrial (young plant).

Stipites 10 cm. longi, squamis pallidis, minute ciliolatis, circa 15 mm. longis, vestiti. Frondes lanceolatae, bipinnatifidae, usque ad 100 cm. longae et 20 cm. latae; pinnae inferiores sensim reductae et remotae. Rachis utrinque pilis pallidis 5 mm. longis dense vestita. Pinnae sessiles, erectae vel leviter patentes, usque ad 12 cm. longae et 2.5 cm. latae, profunde pinnatifidae, glabrae, coriaceae, in sicco supra fuscae, subtus pallidae. Lobi 4-6 mm. lati, subintegri, leviter falcati, acuti, lobi basales inferiores non raro liberi. Costae utrinque plus minusve pilosae; venae 5-7 utrinque. Sori mediales, ad venas 3-5 inferiores; sporangia pilis fuscis intermixta.

Apparently a small tree fern. The specimen from Siberut is fully fertile, and appears to be from a mature plant; that from Sipora is evidently immature, is smaller and softer in texture, and bears sori, on the lowest veinlets only, on one of its fronds. This is the only recorded example of a simply pinnate *Alsophila* from Malaysia. It is comparable with *A. phegopteroides* Hk. from Peru, as regards size.

Hemitelia sumatrana v.A.v.R.

Siberut: Kloss 12284. Iboet 42.

These lack the very copious ferruginous hairs on rachis and costae which characterise this species, but otherwise are in close agreement.

Polypodiaceae**Acrostichum aureum** Linn.

Siberut: Kloss 14627. Iboet 336.

Pt. I, 1928] *Royal Asiatic Society*.

Antrophyum callifolium Bl.

Siberut: Kloss 13097. Iboet 252, in jungle, epiphyte.

Sipora: Iboet 553.

Aspidium Barberi (Hk.) C. Chr. (*Dictyopteris* Bedd.)

Sipora: Iboet 510, in jungle.

Aspidium irregulare (Pr.) C. Chr. (*Dictyopteris* Pr.)

Siberut: Kloss 14081. Iboet 162, edge of jungle.

Both the above have rather narrow and coriaceous pinnae, drying red. I think there is no doubt that they belong to this species, their peculiarity being due to growth in an exposed position. The species usually grows in full shade.

Asplenium Belangeri Kze.

Siberut: Iboet 291, in jungle, epiphyte.

Asplenium nidus Linn. var. *phyllitidis* (Don).

Siberut: Kloss 14463. Iboet 239, in jungle, epiphyte.

Sipora: Kloss 14806.

Asplenium paradoxum Bl.

Siberut: Iboet 296, in jungle, epiphyte.

Asplenium pellucidum Lam.

Siberut: Kloss 14601.

Asplenium tenerum Forst.

Siberut: Iboet 287, in jungle.

Blechnum Finlaysonianum Wall.

Siberut: Iboet 37, in jungle.

Ceropteris calomelanos (L.) Und.

Siberut: Iboet 187, edge of jungle.

Cyclophorus acrostichoides (Forst.) Pr.

Siberut: Iboet 58, on trees in jungle.

Sipora: Kloss 14759. Iboet 479, edge of jungle, epiphyte.

Cyclophorus adnascens (Sw.) Desv.

Siberut: Kloss 10592.

Cyclophorus angustatus (Sw.) Desv.

Siberut: Iboet 59, on trees in jungle; 128.

Cyclophorus nummulariifolius (Sw.) C. Chr.

Siberut: Kloss 14495.

Diplazium asperum Bl.

Sipora: Kloss 14737.

Diplazium cordifolium Bl.

Sipora: Kloss 14830. Iboet 475, in jungle.

Diplazium crenatoserratum (Bl.) Moore.

Sipora: Iboet 557, in jungle terrestrial.

Some fronds are proliferous at the apex, an unusual feature in this species.

Dryopteris crassifolia (Bl.) O. Kze.

Sipora: Iboet 556.

A form with few pinnae, the sterile to 4 cm. broad, fertile to 2.5 cm. broad. Exactly similar specimens have been found in the Malay Peninsula. The species as I understand it has a wide range of variation.

Dryopteris glaucostipes (Bedd.) C. Chr.

Siberut: Kloss 10574.

Agrees well with the type collection of this species, from the lowlands of Perak, except that the upper surface, and to some extent the costules beneath, are hairy. The lower surface of the pinnae is covered with small yellow glands; these are also present in the type collection.

Dryopteris heterocarpa (Bl.) O. Kze.

Siberut: Iboet 186, edge of jungle.

Dryopteris malayensis C. Chr.

Siberut: Kloss 13087.

Dryopteris truncata (Poir.) O. Kze.

Siberut: Iboet 163, in jungle.

Dryopteris urophylla (Wall.) C. Chr.

Siberut: Kloss 13086.

The pinnae are very broadly cuneate at the base; in this they agree with a specimen of Raap's from the Batu Islands.

Humata repens (L. fil.) Diels.

Siberut: Iboet 343, on trees in jungle. Native name, Kela kela. 253, on tall trees (fronds small, 2 to 5 cm. long).

Hymenolepis spicata (L. fil.) Pr.

Siberut: Iboet 90, in jungle on dead trunk.

Leptochilus diversifolius (Bl.) C. Chr.

Sipora: Kloss 14805. Iboet 531, in jungle.

Lindsaya decomposita Willd.

Siberut: Iboet 114, in jungle.

Lindsaya lancea (L.) Bedd.

Sipora: Kloss 14821. Terrestrial.

Lindsaya pectinata Bl.

Siberut: Iboet 115, on log in jungle.

Sipora: Iboet 499, in jungle, epiphyte.

Lindsaya tenuifolia Bl.

Sipora: Kloss 14741. Iboet 515, in jungle, by water.

Luerssenia kehdingiana (Luerss.) Kuhn.

Sipora: Kloss 14766.

Microlepia Ridleyi Copeland

Sipora: Kloss 14659.

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Older collections of this species, which occurs in the Malay Peninsula from Patani southwards, were identified as *M. Kurzii* (Clarke), which appears to me to be only a hairy form of *M. platyphylla*, (Don). *M. Ridleyi* is clearly allied to *M. platyphylla*, but as Copeland remarks it differs markedly in texture, inconspicuous veins, and in the hairiness and form of the indusia. Specimens from various parts of the Peninsula vary considerably as regards size of the pinnules, and young plants have particularly large ones. The pinnules of the Mentawi fern are rather smaller than those of the type. Specimens of Bishop Hose from Borneo at Kew are probably also to be referred here. *M. puberula* v.A.v.R. from Java is closely allied, and may be identical.

***Nephrolepis exaltata* (L.) Schott.**

Siberut: Kloss 10589. Iboet 320, in jungle, on trees.

Sipora: Iboet 408. Native name Kella kella.

***Polypodium heterocarpum* (Bl.) Mett.**

Siberut: Iboet 293, in jungle, epiphyte.

***Polypodium longissimum* Bl.**

Siberut: Kloss 14616. Iboet 329, near the sea.

***Polypodium macrophyllum* (Bl.) Reinw.**

Sipora: Iboet 536, in jungle.

This is *Pleopeltis macrophylla* v.A.v.R., forma typica (*Handbook, Suppl.*, p. 404).

***Polypodium nigrescens* Bl.**

Siberut: Iboet 161, on dead trunk in jungle.

Sipora: Iboet 467, edge of jungle, epiphyte.

***Polypodium papilliferum* n. sp.**

Sipora: Kloss 14800.

Goniophlebium. Rhizoma \pm 5 mm. crassum, repens, squamis brunneis fuscis vestitum. Squamae usque ad 8 mm. longae, subulatae, ciliatae, basi peltatae. Stipites 5 cm. distantes, \pm 25 cm. longi, pallidi, glabri vel squamis muniti. Frondes 60-70 cm. longae, usque ad 25 cm. latae. Rachis squamis parvulis, ciliatis, caducis, orbiculatis vel acutis, munita. Pinnae glabrae, herbaceae erectae, apicem versus falcatae, \pm 15 mm. latae, basi late truncatae, (pinnae superiores basi cuneatae) margine leviter denticulatae; pinnae inferiores maximae. Areolae 2-seriatae; sori in areolis primariis, profunde immersi, supra papillas graciles acutas, 2 mm. longas, formantes.

The distinctive features of this species are the very narrow ciliate scales (those of the rachis being similar to those on the rhizome, but much smaller, and sometimes lacking the point) and the very acute soral papillae.



Trichomanes aphlebiodes. Rhizome with aphlebial and bases of normal fronds. Two thirds natural size.



Polypodium phymatodes Linn.

Siberut: Kloss 14555.

Sipora: Kloss 14648.

Polypodium revolutum (J. Sm.) C. Chr.

Siberut: Kloss 12281.

Polypodium sinuosum Wall.

Siberut: Kloss 10580. Iboet 258, in jungle, epiphyte.

Pteris longipinnula Wall.

Siberut: Iboet 321, in jungle, terrestrial.

Pteris quadriaurita Retz.

Sipora: Kloss 14765

Pteris tripartita Sw.

Siberut: Kloss 14628

Stenosemia aurita (Sw.) Pr. var. **minor** Christ.

Siberut: Kloss 14621

Taenitis blechnoides (Willd.) Sw.

Siberut: Kloss 12291. Iboet 38, 509, in jungle.

Vittaria scolopendrina (Bory) Thwaites.

Siberut: Kloss 14586. Iboet 233, in jungle, epiphyte.

Spolia Mentawiensia: Musci

By H. N. DIXON, M.A. F.L.S.

Amongst the plants obtained by Mr. C. Boden Kloss during his visit to the Mentawi Islands off the West Coast of Sumatra (vide Kew Bulletin, No. 2, 1926; Journ. Malayan Branch R.A.S., IV 1926 pp 167-170) were a few mosses. There is only one new species *Syrrhopodon hispidissimus*, as the *Philonotis* which I at first thought was a novelty is perhaps best not separated from *P. mollis*.

1. **Leucobryum sanctum** (Brid.) Hampe. Siberut I., (12289).
2. **Syrrhopodon hispidissimus** Dixon sp. nov.

Eu-Syrrhopodon. ?Ciliati. Humilis, vix 1 cm. altus, albidus. Folia e basi erecta rigide patula, sicca minime mutata nisi lamina arcte convoluta, tubulosa. Lamina supra basin plus minus contracta, superne latior, anguste ligulata, subobtusa vel minute apiculata, limbo hyalino ubique dense breviter serrulato circumdata; cellulae superiores arcte alte papillosae. Folii vagina circa tertiam partem folii longitudinem aequans, perconcava, cellulis cancellinis fere omnino impleta, limbo angusto circumdata, superne spiculis praelongis arcte ciliata. Costa angusta, Pt. I, 1928] *Royal Asiatic Society*.

inferne sectione rotundata, cellulas homogeneas minutas valde chlorophyllosas exhibens, superne subpellucida, dorso et ventri ab infima lamina ad apicem ciliis perlongis valde hispida. Cellulae cancellinae breviter rectangulares. Cetera ignota.

Siberut I., on roots of *Lycopodium nummulariifolium* (10581b).

A very remarkable species, resembling in habit and leaf form *S. albo-vaginat*us, *S. mamillatus*, &c., but with a striking armature (easily seen with the lens), resembling that of *Exodictyon Sullivantii* (Doz. & Molk.) but quite different in the structure of the nerve. This indeed presents a difficulty, as it is without the Guide-cells to be expected in Eu-Syrhropodon, and resembles that of the sub-genus or genus *Leucophanella*, to which, however, it cannot be referred. The ciliate spines on both back and front of nerve are remarkably long, often equalling in length the width of half the leaf, or more, and presenting a formidable appearance when the leaf is viewed in profile, though a surface view of the lamina may almost conceal them.

3. **Syrhropodon ciliatus** (Hook.) f. *pseudopodiana* Fleisch. Siberut I., on bark of trees (10592b).

4. **Syrhropodon fasciculatus** Hook. & Grev. Siberut I., on roots of *Antrophyum reticulatum* (13097b).

5. **Calymperes longifolium** Mitt. Siberut I., on a log (10498).

6. **Philonotis mollis** (Doz. & Molk.) Bry. jav. *forma*. Siberut I. (14503).

This differs from typical *P. mollis* in having the capsule of thin texture, with wide exothecium cells thin-walled and not collenchymatous, so that the capsules are very little plicate, and may be quite without furrows if gathered before absolutely mature. The processes of the inner peristome also are less developed, and shorter than the outer teeth. A plant, however, collected near Brastagi, Sumatra, by Mrs. Burkill (16325) while of the same character, showed a capsule with almost the normal furrowing, and I have thought it best to place it under the present species.

7. **Ectropothecium momumentorum** (Duby) Jaeg. Probably this, but no flowers were seen, and only old perichaetia. Siberut I., on upper surface of a living Fomes (14589a).

8. **Trismegistia lancifolia** (Harv.) Broth. var. *obtusata* Herz. Siberut I., on roots of *Asplenium nidus* (14463b).

9. **Trichosteleum Boschii** (Doz. & Molk.) Jaeg. Siberut I., on a log (10499).

A list of the Land and Fresh-water Mollusca of the Malay Peninsula with notes

By F. F. LAIDLAW, M.A.

Introduction.

I regret that I can lay claim to no special qualifications which justify me in attempting to draw up a list of the land and fresh-water molluscs of the Malay Peninsula. My excuses are, first an enthusiasm for the subject, and second non-existence of any such list.

These animals are fairly numerous and tolerably important constituent of the Malayan fauna, and the publication of a list however incomplete should serve to stimulate interest in the group.

The *Area* from which I propose to record species is the Peninsula south of the Isthmus of Kra, including the islands politically dependent on it, including also the islands of the Samui group, but excluding islands of the Mergui Archipelago. As a matter of convenience I have grouped the land and fresh-water forms in separate series.

As regards the *Classification* adopted, certain families have presented little or no difficulty. This is due to the fact that for such families (e.g. *Cyclophoridae*) I have been able to refer to adequate monographic accounts, in which details of classification have been worked out more or less satisfactorily. In other cases, and especially in the big family *Zonitidae* the state of affairs is less fortunate. In this family the difficulties in the way of arranging the species and genera in an order which may be regarded as approximately natural, are very great. The late Col. Godwin-Austen devoted his attention most chiefly to the very numerous Indian species of the family, and until the anatomy of many more of the Malayan forms has been studied an entirely natural grouping of these remains out of the question. Such characters are to a large extent unreliable in this family. In this respect the *Helicidae* differ. In their case an acquaintance with the shell of a species is as a rule sufficient to justify an estimate of its position. Where a monographic or synonymic list of a family or genus is available I do not give references to publications of a date prior to such a list. Thus for the *Cyclophoridae* I do not give references earlier than to Kobelt: *Monograph of the Cyclophoridae*, where a synonymy and list of references that seems to me to be very full, can be found.

Bionomics etc. Little can be said on this subject. Certain families are carnivorous, notably the *Streptaxidae* and *Rathoussiidae* amongst the land forms; most of the terrestrial families are vegetable feeders. Some may have a certain economic importance, though, so far as Malaya is concerned I have no definite information. It is not improbable that fresh water forms

may be of interest as intermediate hosts of trematodes, though they have not attained the notoriety achieved by fresh-water molluscs in certain other intertropical countries.

Under the headings of the different families and sub-families I have appended a few notes which may be useful to anyone who is disposed to collect 'snails.' Such a collection will prove a "hobby" worth the riding, is easily stored, is less perishable than for example a collection of insects; and it is still probable that an enthusiast will add to our knowledge of the fauna by the discovery of undescribed species, as well as by a study of the habits and life-history of its members. After the vertebrates and the insects, some distance after it is true, molluscs have proved the most successful colonists of the land, and they seem to have thrown in more than one army of invasion. For this reason amongst others a thorough knowledge of the distribution of the molluscan land-fauna should be of value in estimating the changes which have from time to time taken place in the land surfaces.

The list makes no pretensions of being critical. No doubt some few of the species included will prove to be synonyms; a small number of incorrect identifications and perhaps a few incorrect localizations will perhaps occur in it. For these I apologize, and will repeat that I believe the publication of this list however imperfect is the most likely way of bringing into existence ere long a full, critical and reasoned account of the Molluscan fauna of Malaya.

Land Mollusca. Part. I Operculata.

GASTEROPODA.

I. Prosobranchiata (Streptoneura).

A. *Diotocardia*.

Rhipidoglossa.

Family *Hydrocenidae*.

A small family represented in Tropical Asia by the genus *Georissa*, which includes a small number of minute turbinate shells, living apparently in very damp situations. It is worth remark that two of the known Burmese species are recorded from the Farm Caves, Moulmein, whilst both the mainland Malayan species have been also taken in caves.

***Georissa monterosatiana* Godwin-Austen & Nevill.**

Georissa monterosatiana Godwin-Austen & Nevill, Proc. Zool. Soc. London, 1879, pp. 739-740, Pl. LIX fig. 6. Sykes, Proc. Zool. Soc. London, 1903, p. 199. Perak (Godwin-Austen & Nevill). Sykes' specimens were from a cave near Bisirat in Jalor (Skeat Expedition).

Georissa semisculpta Godwin-Austen & Nevill.

Georissa semisculpta Godwin-Austen & Nevill, Proc. Zool. Soc. London, 1879, p. 740, pl. LIX figs 3. 3a. Cave on Bukit Podong, Perak.

Georissa samuiana Mlldff.

Georissa samuiana v. Mollendorff, Proc. Zool. Soc. London, 1894, p. 154. Samui Island.

B. Monotocardia.*Taenioglossa.*

Family *Cyclophoridae*. Fischer.

The largest family of terrestrial operculate molluscs. It has its headquarters in Tropical Asia, and is represented more sparingly in Africa and Tropical America, where it is out numbered by the other big operculate family, the *Cyclostomatidae*. This latter reaches S. India and Ceylon but has representatives E. of the Bay of Bengal.

The *Cyclophoridae* range in size from the big *Cyclophorus* which may reach an inch and a half in diameter, to minute *Diplommatina*'s scarcely a millimetre and a half long.

Following Kobelt who has published an excellent monograph of the family, (Das Tierreich. *Cyclophoridae*. Berlin 1902), the very large number of species are grouped in sub-families and sections.

Sub. family *Cyclophorinae*.

Shell conoidal or orbicular. Usually of large or moderate size. Confined to the old world Tropics.

1. Section ***Cyclophoreae***.

Operculum horny, simple. Old world Tropics.

Leptopoma (Leptopoma) lowi L. Pfr.

L. (L.) lowi, Kobelt, p. 11.

Koh Si Hak. Tale Sap. Singgora.

Two specimens. Compared with Bornean examples these have a spire slightly less elevated, otherwise I cannot distinguish them. The species is hitherto recorded from Borneo and doubtfully from "Malacca."

Leptopoma (Leptopoma) vitreum (Less.).

L. (L.) vitreum, Kobelt, p. 15.

Koh Si Hah. Tale Sap. Singgora.

One specimen. Agrees well with specimens from New Guinea. Recorded from the Philippines, New Guinea, and Formosa.

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Leptopoma (Trocholeptopoma) aspirans Benson.*L. (T.) aspirans*, Kobelt, p. 19.*Leptopoma aspirans* Sykes, Proc. Zool. Soc. London, 1903 p. 194. Mollendorff. Nachr. Deut. Malak. Gesell., 1902, p. 161.

Biserat in Jalor. Bukit Podong and Kinta Valley, Perak.

Japonia (Lagochilus) garreli (Eyd. & Soul.).*J. (L.) garreli*, Kobelt, p. 43.

Penang.

Japonia (Lagochilus) kobelti Sykes.*Lagochilus kobelti*, Sykes, Proc. Zool. Soc. London, 1903, pp. 194-195, Pl. XX, figs. 13-14-15.

Biserat in Jalor (Skeat Expdn.).

Japonia (Lagochilus) liratula Mlldff.*J. (L.) liratula*, Kobelt, pp. 47-48.

Samui Is.

Japonia (Lagochilus) rollei (Mlldff.).*Lagochilus rollei*, v. Mollendorff. Tachr. Deut. Malak. Gesell. 1902, p. 141.*Lagochilus townsendi*, Sykes (nec Crosse), Proc. Zool. Soc. London, 1903, p. 195.

Kelantan (Waterstradt).

Japonia (Lagochilus) striolata (Stol.).*J. (L.) striolata*, Kobelt, p. 55.

Penang.

Japonia (Lagochilus) swettenhami (Morg.).*J. (L.) swettenhami*, Kobelt, p. 56.

Perak.

Japonia (Lagochilus) townsendi (Crosse).*J. (L.) townsendi*, Kobelt, pp. 56-57.

Perak.

Japonia (Lagochilus) trochoides (Stol.).*J. (L.) trochoides*, Kobelt, p. 57.

Penang.

Ditropis cavernae Sykes.*Ditropis cavernae*, Sykes, Proc. Zool. Soc. London, 1903, p. 195. Pl. XX, figs. 17-19. Cave near Biserat in Jalor (Skeat Expedn.).

[A genus which includes a number of small often almost orbicular species with strongly ridged shells; recorded from Peninsular India, Borneo, Java, the Philippine Islands and the Moluccas. A single species is known from E. Africa, and one from N. Australia.]

Cyclophorus (Litostylus) semisulcatus Sow.*C. (L.) semisulcatus*, Kobelt, pp. 103-104.

Perak. Koh-si-Hah, Singgora.

[The genus *Cyclophorus* includes the large arboreal molluscs whose dead shells are often found amongst the dead leaves and debris of the forest floor. The shells when fresh are generally finely coloured with mottled brown and white, or yellow vaguely reminiscent of the familiar English *Helix aspersa* but with more flattened spire and with a thick rim to the mouth].

Cyclophorus (Cyclophorus) cantori (Benson).*C. (C.) cantori*, Kobelt, p. 135.

Penang. Also recorded from Cambodia.

Cyclophorus (Salpingophorus) aquilus (Sow.).*C. (S.) aquilus*, Kobelt, p. 124.

Singapore.

Cyclophorus (Salpingophorus) aurantiacus (Schum.).*C. (S.) aurantiacus*, Kobelt, p. 125.

(Mergui Archipelago), Perak.

Cyclophorus (Salpingophorus) debeauxi Crosse.*C. (S.) debeauxi*, Kobelt, p. 127.

Singapore.

Cyclophorus (Salpingophorus) excellens (L. Pfr.).*C. (S.) excellens*, Kobelt, p. 128.

Several specimens from Koh Si Hah, Tale Sap, Singgora.

The species is recorded also from Tenasserim.

Cyclophorus (Salpingophorus) expansus (L. Pfr.).*C. (S.) expansus*, Kobelt, p. 129.

Perak. Also Tenasserim and Mergui.

Cyclophorus (Salpingophorus) malayanus (Bens.).*C. (S.) malayanus*, Kobelt, p. 130.

Perak.

Cyclophorus (Salpingophorus) perdix (Brod. & Sow.).*C. (S.) perdix*, Kobelt, p. 131.

I have compared specimens from Koh-Si-Hah, with authentic examples in the British Museum, and cannot separate them. Mr. Tomlin has been kind enough to examine the specimens, and agrees with this determination. Probably the records of *C. borneensis* from the Peninsula should refer rather to this species. Closely allied forms, or races, occur in Borneo, Sumatra and Java.

var *unicolor* nov.

Two specimens from Koh-Si-Hah otherwise agreeing with the typical form, are characterized by the absence of any colour

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pattern, the whole shell being of a uniform brownish-yellow colour, with the same rather silky surface that characterizes typical specimens. A varietal name seems necessary for this pretty form.

Cyclophorus (Salpingophorus) pfeifferi Reeve.

C. (S.) pfeifferi, Kobelt, p. 131.

Koh Si Han, Tale Sap, Singgora. One very dead shell. Recorded also from Penang.

Cyclophorus (Salpingophorus) porphyreticus (Bens.).

C. (S.) porphyreticus, Kobelt, p. 132.

Penang.

Cyclophorus (Salpingophorus) tuba (Sow.).

C. (S.) tuba, Kobelt, pp. 134-135.

Cyclophorus tuba, Sykes, Proc. Zool. Soc. London, 1903, p. 193. "Malacca." Perak.

"Probably *C. borneensis* recorded by de Morgan from Perak belongs to this species." Sykes (loc. cit.)

II. Section **Pterocycleae**.

Shell moderate or rather small in size, usually orbicular. Operculum horny, with well-marked spiral on its outer surface, the margin of the spire often with projecting fringe. The peristome (mouth) of the shell is usually furnished with a wing-like expansion on the sutural line in the genus *Pterocyclus*, whilst in *Rhiostoma* the last whorl of the shell tends to be solute and the expansion is drawn out into a remarkable tube or siphon, by means of which perhaps the animal is able to inhale to a limited extent when the operculum is closed. In *Rhiostoma* too the operculum has its outer surface frequently worn perfectly smooth, by what means I do not know.

This section of the subfamily is richly represented in Assam, ranges to China and Japan, and southward to the Celebes, but appears to be absent from the Philippine Islands.

Pterocyclus blandi Bens.

P. blandi, Kobelt, p. 163.

'Pulo Susson' near Penang. (Probably Pulau Song-Song).

Pterocyclus regelspergeri (Morg.).

P. regelspergeri, Kobelt, p. 168.

Perak.

Pterocyclus subalatus Sykes.

P. subalatus, Sykes, Proc. Zool. Soc. London, 1903, pp. 195-196. Pl. XX figs. 1. 2.

Gunong Inas. Perak. ('Skeat' Expedition).

Rhiostoma asiphon Mlldff.

R. asiphon, Kobelt, pp. 176-177.

Samui Island, Gulf of Siam.

Rhiostoma housei (Haines).*R. housei*, Kobelt, p. 178.

Samui Island, Gulf of Siam. Siam.

Rhiostoma jalorense Sykes.*Rhiostoma jalorense*, Sykes, Proc. Zool. Soc. London, 1903, p. 179, Pl. XX, figs 6.7.8.

Limestone hills and caves, Biserat, Jalor.

Cliffs, Koh-Si-Hah. Tale Sap. Singgora.

Rhiostoma jousseaumei Morg.*R. jousseaumei*, Kobelt, p. 178.? *Rhiostoma* sp., Sykes, Proc. Zool. Soc. London, 1903, p. 196.

Perak. I believe Sykes' specimen which is from Kelantan is to be referred here.

III. Section **Cyclotaceae**.

Shell of moderate or rather small size. Operculum calcareous without appendages or projecting fringe. Shell orbicular. This section includes species with shells very similar to those of the last section (*Pterocycleae*). A closely parallel development of the tube or siphon is found in some genera of either series e.g. *Rhiostoma* and *Opisthoporus*.

The range of the *Cyclotaceae* is rather wider than that of the *Pterocycleae*, and on the whole the present section has a more southerly and easterly distribution, which includes the Philippine Islands. The tube-bearing forms are especially abundant in Indo-China, Malaya and Borneo.

Platyrhaphe lowi (Morg.).*P. lowi*, Kobelt p. 184.

Perak.

Platyrhaphe chrysalis Sykes.*Platyrhaphe chrysalis*, Sykes, Journ. of Malac., 1902, IX p. 23, Pl. iii figs 3.4.

Kelantan.

Cyclotus (Procyclotus) linstedti (L. Pfr.).*C. (P.) linstedti*, Kobelt, p. 206.

Mt. Ophir.

Opisthoporus bialatus Mlldff.*Cyclotus (Opisthoporus) bialatus*, Möllendorff, Nachr. Deut. Malak. Gesell., 1902, p. 142.

Kelantan.

Opisthoporus dantzenbergi Sykes.*Opisthoporus dantzenbergi*, Sykes, Journ. of Malac., 1902, IX. p. 23. Pl. iii figs. 5.6.Pt. I, 1928] *Royal Asiatic Society*.

?*Opisthoporus penangensis*, Sykes, Proc. Zool. Soc. London, 1903, p. 196.

Kelantan.

Sykes remarks (loc. cit. 1902) that he thinks *O. rostellatus* and *penangensis* may prove to be conspecific. The specimens referred by him with a query to *penangensis* may perhaps belong here.

***Opisthoporus rostellatus* (L. Pfr.).**

Cyclotus (*O.*) *rostellatus*, Kobelt, p. 217.

Singapore, Sumatra, Borneo.

(See note under last species).

***Opisthoporus penangensis* (Stol.).**

Cyclotus (*Siphonocyclus*) *penangensis*, Kobelt, p. 210.

Penang.

***Cyclotus* (*Siphonocyclus*) *setosus* (Mlldff.).**

C. (S.) setosus, Kobelt, p. 21.

Samui Island.

***Cyclotus* (*Siphonocyclus*) *solutus* (Stol.).**

C. (S.) solutus, Kobelt, pp. 211-212.

C. (S.) solutus Stol. *subsolutus*, Möllendorff, Nachr. Deut. Malak. Gesell., 1902, p. 142.

Typical form from Penang and Perak. Möllendorff regards his new form from Kelantan as a subspecies of *solutus*. Sykes (teste Möllendorff loc. cit.) has recorded the same form as *Opisthoporus tener* Menke.

***Cyclotus* (*Siphonocyclus*) *tener* (Menke).**

C. (S.) tener, Kobelt, p. 212.

Specimens from near the Tale Sap agree closely with the description of this species. They are also near the form *subsolutus* of *solutus*. Possibly the two species run into each other, or the specific or subspecific standing is a matter of opinion.

Sub-family *Pupininae*.

Shell moderate or rather small in size pupaeiform or spindle-shaped. Mouth opening nearly circular, often with marginal slit or canal. Operculum flat, with many whorls, without any appendage.

Distribution Tropical Asia and Australia.

I. Section *Pupinellae*.

Shell not polished, with more or less evident radial striation. Suture impressed.

Distribution Peninsula India and Ceylon, Further India and Indo-China, Malaya Peninsula and Archipelago to New Guinea.

***Rhaphaulus perakensis* Smith.**

Rhaphaulus perakensis, Kobelt pp. 276-277.

Rhaphaulus perakensis, Smith, var. *ialorensis*, Sykes, Proc. Zool. Soc. London, 1903, p. 197 Pl. XX figs. 9-10.

The type is from Perak, the variety (which as Sykes suggests loc. cit. is possibly a distinct species) is from 2000 ft. on Bukit Besar in Jalor.

Rhaphaulus lorraini (L. Pfr.).

Rhaphaulus lorraini, Kobelt, p. 276.

(?) *Rhaphaulus ascendens*, Sykes, Proc. Zool. Soc. London, 1903, pp. 196-197, Pl. XX figs. 11. 12.

I have been able to compare a specimen of *ascendens* with the British Museum material of *lorraini*, and think the differences between them do not exceed the limits of variation within a series of the latter.

Penang (*lorraini*). Patalung, from rotten wood (Skeat Exped.) (*ascendens*).

Pollicaria elephas (Morg.).

P. elephas, Kobelt, p. 259.

'Malacca.' I have been told, I cannot remember by whom, that the Sakais string these shells for necklaces.

Schistoloma sectilabrum (A. Gould).

Schistoloma sectilabrum, Kobelt, p. 280. Sykes, Proc. Zool. Soc. London, 1903, p. 197.

Coptochilus sectilabrum, Möllendorff. Nachr. Deut. Malak. Gesell., 1902, p. 148.

Ulu Selama, Perak (Skeat. Exp.).

Lampun Patalung. N. Annandale. "On under surfaces of leaves of zingiberaceous plants." Recorded also from Burma.

Schistoloma anastoma (Bens.).

Schistoloma anastoma, Sykes, Proc. Zool. Soc. London, 1903, p. 197. Kobelt, pp. 278-279.

Belimbing, Ligei. Also Labuan. Java.

Schistoloma perakense (Fult.).

Coptocheilus perakensis, Fulton, Journ. of Malac., 1903, X p. 102.

Perak.

II. Section *Pupineae*

Shell highly polished, not striate; suture as a rule not impressed. Mouth opening round, and in Malayan forms with two slit-like canals.

Absent from Peninsular India and Ceylon, distribution otherwise as for the subfamily.

Pupina (Tylotoechus) artata Bens.

P. (T.) artata, Kobelt, p. 306.

Burma, Perak, Samui Islands.

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Pupina (Tylotoechus) arula Bens. var **perakensis**.*P. (T.) arula* var. *perakensis*, Kobelt, p. 307.

Perak. Typical form from Burma.

Pupina (Tylotoechus) aureola Stol.*P. (T.) aureola*, Kobelt, p. 307.*Pupina aureola*, Sykes, Proc. Zool. Soc. London, 1903., p. 197.

Perak. Penang. Jalor.

Pupina (Tylotoechus) excisa Mildff.*Pupina (Tylotoechus) excisa*, Möllendorff, Nachr. Deut. Malak. Gesell., 1902, p. 143.**Pupina (Tylotoechus) lowi** Morg.*P. (T.) lowi*, Kobelt p. 317.*Pupina lowi*, Sykes, Proc. Zool. Soc. London, 1903, p. 197.

Perak.

Pupina (Tylotoechus) pallens Mildff.*P. (T.) pallens*, Kobelt, pp. 318-319.

Samui Island.

Pupina (Tylotoechus) tchehelensis Morg.*P. T. tchehelensis*, Kobelt, p. 323.Sub-family. *Alycaeinae*.

Shell moderately or very small, umbilicated, without colour-pattern, whitish, with apex often golden-brown or yellow; shape pyramindal or orbicular; usually with fine radial striation. There is a marked constriction a little way behind the mouth, and immediately behind this constriction indications of a short sutural tube. Immediately behind this constriction the radial striations become crowded together for a short distance.

The operculum is thin and flat, or in some cases carries a small cup-shaped projection at its middle externally. The sub-family is absent from Ceylon, occurs in Peninsular India; reaches its maximum in Assam and Burma, and ranges thence to Formosa the Philippine Islands and Japan: and through Indo-China, Siam, the Malay Peninsula, the Great Sunda Islands to the Celebes.

Alycaeus (Alycaeus) conformis Fulton.

Alycaeus conformis, Fulton, Ann. Mag. Nat. Hist., (7) IX 1902, p. 68 Möllendorff, Nachr. Deut. Malak. Gesell., 1902, p. 162 Sykes. Proc. Zool. Soc. London, 1903, p. 195.

Perak. Kwala Aring, Kelantan.

Alycaeus (Alycaeus) gibbosulus Stol.*A. (A.) gibbosulus*, Kobelt, p. 344.*Alycaeus gibbosulus* Sykes. Journ. of Malac., 1902, IX p. 62.

Penang (Kobelt). Kelantan (Sykes).

Alycaeus (Alycaeus) jagori Marts.*A. (A.) jagori*, Kobelt, p. 346.

Perak. Also Java and Celebes (Kobelt).

Alycaeus (Alycaeus) kapayanensis Morgan.*A. (A.) kapayanensis*, Kobelt, p. 346.

Perak.

Alycaeus (Alycaeus) kelantanensis Sykes.*Alycaeus kelantanensis*, Sykes, Journ. of Malac. 1902 IX p. 62. Pl. III figs 11-12.*Alycaeus (Orthalycaeus) kelantanensis*, Möllendorff, Nachr. Deut. Malak. Gesell., 1902, p. 145.

Kelantan.

Alycaeus (Alycaeus) liratulus (Preston).*Pincerna liratula*. Preston, Proc. Malac. Soc. London, 1907, VII p. 206 text. fig.

Kelantan. Kobelt figures a condition of the operculum of *A. kukenthali* precisely similar to that figured by Preston for the present species. As his generic definition depends on this peculiarity of the operculum it seems to me that *Pincerna* cannot stand. (Cf. Kobelt, p. 358. fig. 80). The species seems near *A. globosus* from Borneo.

Alycaeus (Alycaeus) perakensis Crosse.*A. (A.) perakensis*, Kobelt, p. 345.*Alycaeus perakensis*, Sykes, Proc. Zool. Soc. London, 1903, p. 195.

Perak. Biserat, Jalor.

Alycaeus (Alycaeus) roebelini Mlldff.*A. (A.) roebelini*, Kobelt, p. 350.

Samui. Patalung.

This species shows a certain amount of variability in size and in relative height of the spire. It is very closely allied to the preceding species.

Alycaeus (Alycaeus) thieroti Morg.*A. (A.) thieroti*, Kobelt, p. 352.*Alycaeus thieroti*, Sykes, Proc. Zool. Soc. London, 1903, p. 197.

Perak. Belimbing., Ligei.

Alycaeus (Chamalycaeus) canaliculatus Mlldff.*A. (C.) canaliculatus*, Kobelt, p. 353.

Samui Is.

Alycaeus (Chamalycaeus) diplochilus Mlldff.*A. (C.) diplochilus*, Kobelt, pp. 355-356.

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Alycaeus diplocheilus, Sykes, Proc. Zool. Soc. London, 1903, p. 195.

Perak. Biserat, Jalor, from a cave.

Alycaeus (Chamalycaeus) jousseaumei (Morgan).

A. (C.) jousseaumei, Kobelt, p. 357.

Perak.

Alycaeus (Chamalycaeus) microdiscus Mlldff.

A. (C.) microdiscus, Kobelt, p. 358.

Perak.

Alycaeus (Chamalycaeus) microcorus Mlldff.

A. (C.) microcorus, Kobelt, p. 355.

Perak.

Alycaeus (Chamalycaeus) oligopleuris Mlldff.

A. (C.) oligopleuris, Kobelt, pp. 360-361.

Perak.

Alycaeus (Chamalycaeus) parvulus Mlldff.

A. (C.) parvulus, Kobelt, p. 361.

Perak.

Sub-family *Diplommatinae*.

Small or very small shells, often ribbed radially, spindle-shaped often with the last whorl contracted. Peristome frequently double. Distribution, Tropical Asia to Japan and N. China, Pacific Islands to New Zealand. Two or three species from Tropical America (? introduced).

These tiny shells are often of great beauty. The number of species existing is probably very large, many forms having a restricted distribution.

The remarkable genus *Opisthostoma* has the last whorl uncoiled giving the shell a remarkable appearance.

Opisthostoma annandalei Sykes.

Opisthostoma annandalei, Sykes, Proc. Zool. Soc. London, 1903, p. 198-Pl. XX figs. 4.5.

A single specimen from shell deposit in limestone cave near Biserat in Jalor.

Opisthostoma laidlawi Sykes.

Opisthostoma laidlawi, Sykes, Journ. of Malac., 1902, IX p. 22. Pl. iii fig. 14.

Kelantan.

Opisthostoma paulucciae Crosse & G. Nev.

Opisthostoma (Opisthostoma) paulucciae, Kboelt, p. 414.

Perak.

Opisthostoma perakense G.-A. & G. Nev.

Opisthostoma (Opisthostoma) perakense, Kobelt, p. 414.
Perak.

Diplommatina (Diplommatina crosseana) G.-A. & G. Nev.

D. (D.) crosseana, Kobelt, p. 429.
Perak.

Diplommatina (Diplommatina) mirabilis G.-A. & G. Nev.

D. (D.) mirabilis, Kobelt, p. 438.
Perak.

Diplommatina (Sinica) canaliculata Mlldff.

D. (S.) canaliculata, Kobelt, p. 458.
Perak.

Diplommatina (Sinica) diminuta Mlldff.

D. (S.) diminuta, Kobelt, p. 462.
Perak.

Diplommatina (Sinica) laidlawi Sykes.

Diplommatina laidlawi, Sykes, Proc. Zool. Soc., London,
1903, pp. 198-199 Pl. XX fig. 16.
Perak, Gunong Inas 3000-4500 ft.

Diplommatina (Sinica) nevillei (Crosse).

D. (S.) nevillei, Kobelt, pp. 467-468.
Perak.

Diplommatina (Sinica) samuiana Mlldff.

D. (S.) samuiana, Kobelt, pp. 471-472.
Samui Is.

Diplommatina (Sinica) skeati Sykes.

Diplommatina skeati, Sykes, Proc. Zool. Soc. London, 1903,
p. 198, Pl. XX fig. 3.
Perak, Gunong Inas 5000 ft.

Diplommatina (Sinica) superba G.-A. & G. Nev.

D. (S.) superba, Kobelt, pp. 474-475.
Perak.

Diplommatina (Sinica) ventriculus Mlldff.

D. (S.) ventriculus, Kobelt, pp. 476-477.
Perak.

(To be continued)

On some Carnivora, Rodentia and Insectivora principally from Eastern Borneo

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and C. BODEN KLOSS, *Director of Museums, Straits Settlements*
and *Federated Malay States.*

The Raffles Museum, Singapore, has received for determination from the Zoological Museum, Buitenzorg, Java, part of a collection of mammals made in East Borneo by Mr. H. C. Siebers, the ornithologist of the latter institution, during the course of the Middle-East Borneo Expedition of 1925 (vide "Midden-Ost Borneo Expeditie, 1925" Uitgave van het Indisch Comité voor Wetenschappelijke Onderzoekingen. Batavia, Kolff & Co., 1927).

The material, from the division of Samarinda in East Borneo, was obtained from Tenggarong (lat. $0^{\circ} 25' S.$) on the Mahakam, or Koetai River, a little above Samarinda, and along the banks of the Telen, the upper part of its first large tributary coming in from the north, beginning at Moeara Antjaloeng (lat $0^{\circ} 26' N.$), then at Moeara Marah, Moeara Wahau, Long Poetus, Long Hoet, Long Temelen, Long Liah Leng, Long Petak (lat. $1^{\circ} 43' N.$) and ending at Punt D in the hills about eight kilometres above Long Petak at an altitude of 1172 metres.

The ground covered is that between the Boelongan River to the north where the late Dr. Carl Lumholz collected in 1914-1915 (vide Gyldenstolpe, 1920) and the areas worked by Dr. W. L. Abbott in 1908-1909 in the South-East subdivision of Borneo south of Balik Papan Bay (vide Lyon 1911). Mr. H. C. Raven also collected in Eastern Borneo in 1912-1913 when he ascended the Mahakam River and worked the coast north of its mouth, but the only locality of his we have been able to trace on the river is "Tanggarung," the Tenggarong of this paper (vide Miller 1913).

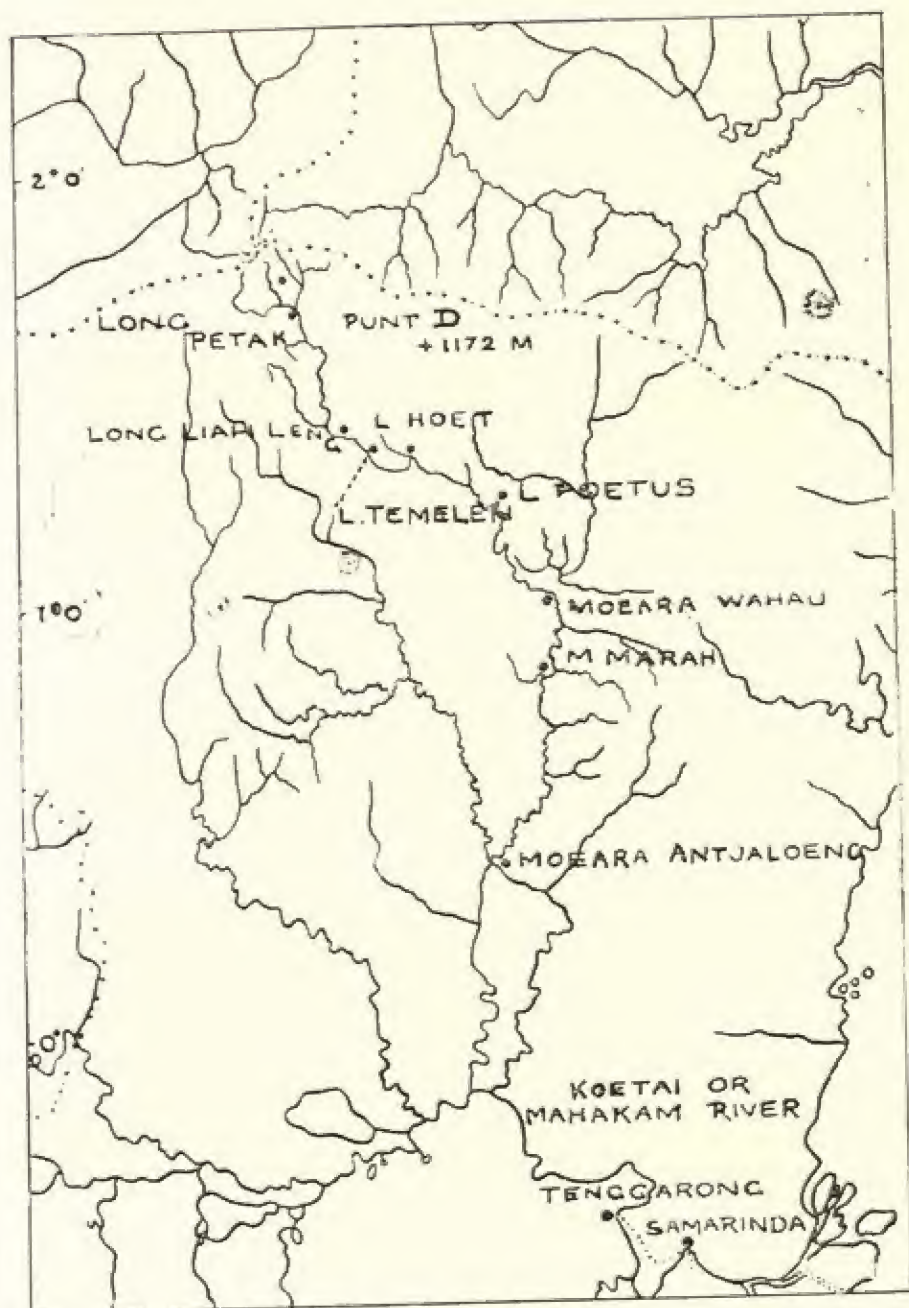
There are also a few specimens from the Melawi River, a tributary of the Kapuas, Western Borneo, collected by Heer A. Blanchemanche.

Considering that Dr. Siebers was probably chiefly engaged in ornithological work the mammal results are interesting. We have ventured to name two new races:—

Nannosciurus melanotus pallidus subsp. nov.

Nannosciurus exilis sordidus subsp. nov.

both characterised by duller colour than the western subspecies.
C.B.K.



Map to illustrate article by Chasen and Kloss on mammals
from Eastern Borneo.

CARNIVORA.

Paradoxurus hermaphroditus sabanus Thomas.

Paradoxurus sabanus Thomas, Ann. Mag. Nat. Hist. (8) III, 1909, p. 376.

Paradoxurus philippinensis Lyon, Proc. U. S. Nat. Mus., XXXIII, 1907, p. 559; id., op. cit., XL, 1911, p. 116.

Lebong Hara, Melawi, W. Borneo 1 ♂.

The Bornean "*Musang*" was generally known as *philippinensis* (which we consider can be linked to the older name *hermaphroditus*) until Thomas described *sabanus* from North Borneo on account of its peculiar buffy olivaceous colour and small size. ("size smallest of the group.")

The specimen before us is generally buffy olive in tone, has an almost whitish frontal band and no indication of spots or stripes on the upperparts.

The skull by no means agrees with the description given for *sabanus* as will be seen from the following measurements.

Skull:—condylo-basal length 102 (92);* palatilar length 45 (42); front of p^1 to back of m^3 (crowns in this case) 32 (28.5); p^4 8 x 9 (7 x 8.4).

The measurements show that the Bornean race is by no means the smallest of the group. Hollister (Proc. U. S. Nat. Mus., XLVI, 1913, p. 313) has also said that *minax* Thomas, of Mindanao does not appear to differ in size from *philippensis* of Luzon, instead of being "markedly larger," though it averages darker in colour. Considering the areas of the habitats we should not expect the Mindanao animals to be larger than those from Luzon, but we should deduce greater size for Bornean animals than for the others. And this seems actually to be the case: Lonnberg (Mag. f. Naturvidenskaberne, 62 (1925) p. 60) records a female and male from the Barito River, Central Borneo, with condylo-basal lengths of 101.5 and 98.5 mm. respectively: and has named these *P. p. baritensis*, because they are so much larger than the type of *P. p. sabanus*.

Thus we are asked to recognise two races of Palm-civet in Borneo, differing in size alone: we are not prepared to do so at present. In such species as this where individuals vary so much with age far more material should be examined before dimensional races are proposed. It is fair to regard one or two adult small rodents or insectivores as fairly representing their congeners in size, but it is not safe to do this with Viverrids.

* Measurements in parentheses are those of the type of *sabanus*.

Paguma larvata leucomystax Gray.

Long Petak 1 ♂.

The immature animal before us differs from a younger male from Betong, Sarawak, in having larger pale areas: the light patch on the face is whiter, the underside of the head and throat are whitish buff and pale wood-brown respectively and not blackish and the white tip on the tail is much larger.

They both appear to answer fairly well to *leucomystax* of Sumatra but we have scarcely enough material to decide whether they are really separable. If so, we are unaware of any name applied solely to Bornean animals.

External dimensions:—head and body 503, tail 482, ear 41 mm.

Skull:—greatest length 108 mm.

Mungos brachyurus rajah (Thomas)

Herpestes brachyurus rajah Thomas, Ann. Mag. Nat. Hist. (9) VIII, 1921, p. 135.

Herpestes brachyurus Lyon, Proc. U. S. Nat. Mus., XL, 1911, p. 117.

Herpestes brachyurus dyakorum Thomas, l.c.s.

Long Petak 2 ♀.

Although one of these specimens is juvenile and the other an adult with worn teeth they are almost identical in colour, the only noticeable difference being that whereas in the adult the top of the head is rather darker than the back in the juvenile it is concolorous with the rest of the upperparts. Although on colour Robinson and Kloss have been unable to recognise *b. sumatrius* Thos. (*vide* Journ. F.M.S. Mus., VII, 1919 p. 303), these Bornean animals appear to be subspecifically distinct from *brachyurus* of the Malay Peninsula by virtue of their less blackish colouring in general and much more buffy tail.

Thomas has applied two names to Bornean animals; *b. rajah* is said to be olivaceous blackish without warmer suffusion and *b. dyakorum* more or less rufous or ochraceous. It is supposed that the former is a lowland and the latter a mountain race. The two skins before us are warmer in tone than a fresh skin from Perak, Malay Peninsula, but the skulls do not show the features said to be characteristic of *dyakorum*. The latter was founded on a skin collected in 1896 (i.e. twenty-five years in store) and some old skins from the Baram river in our possession now present a very rufous appearance. For the present, therefore, we use the prior name *rajah* for all the Bornean mongooses of this formenkreise.

RODENTIA.

Sciurus prevosti atricapillus Schlegel

Sciurus atricapillus Schlegel, Nederl. Tijdschr. Dierk., 1, 1863, p. 27; Bonhote, Ann. Mag. Nat. Hist. (7) VII, 1901, p. 173; Lyon, Proc. U. S. Nat. Mus., XL, 1911, p. 80.

Callosciurus prevosti atricapillus Gyldenstolpe, KUNGL. Sv. Vet. Akademiens Handlingar, Band 60, No. 6, 1920, p. 35.

Moeara Antjaloeng 1 ♂.

In this specimen the feet, tail, nose and adjacent parts of the head are black, and it agrees well with the original description of the Upper Kapuas animal.

Sciurus notatus dulitensis Bonhote.

Sciurus vittatus dulitensis Bonhote, Ann. Mag. Nat. Hist. (7) VII, 1901, p. 451.

S. dulitensis Lyon, Proc. U. S. Nat. Mus. XXXIII, 1907, p. 555; id., op. cit., XL, 1911, p. 84.

Lebong Hara, Melawi, W. Borneo 4 ♂.

These specimens are deep chestnut below and can be exactly matched by examples from Baram in Sarawak.

Sciurus notatus dilutus Miller.

Sciurus dulitensis dilutus Miller, Smiths. Misc. Coll., LXI, 1913, p. 23. (Tanjong Batu. Lat 2° 15' N.)*

Sciurus dulitensis (part.) Lyon, Proc. U. S. Nat. Mus., XL, 1911, p. 84.

Callosciurus vittatus dulitensis (part.) Gyldenstolpe, Kungl. Sv. Vet. Akademiens Handlingar, Band 60; No. 6, 1920, p. 37.

Moeara Antjaloeng 2 ♂, 1 ♀; Marah 5 ♂, 7 ♀; Long Petak 4 ♂, 6 ♀.

From the material at our disposal which includes a fair series from various parts of Sarawak it appears to us that the Bornean squirrels of this group are roughly divisible into two sections on the colour of the underparts although these are so variable that it would often be impossible to name an unlocalised skin. Animals with ochraceous-tawny underparts seem to occur in both the western and eastern halves of the island, but whereas typical *dulitensis* and others from the west often have deep chestnut underparts this rich colour does not seem to occur in examples from the east of Borneo, the majority of which appear to be very much paler on the underparts than the medium coloured animals common to both localities.

* Not the Tanjong Batu Klumpang Bay, Lat. 3° S. visited by Dr. W. L. Abbott (Lyon 1911).

***Sciurus tenuis jentinki* Thomas.**

Sciurus jentinki Thomas, Ann. Mag. Nat. Hist. (5) XX, 1887, p. 129.

Tomeutes jentinki Lonnberg and Mjoberg, Ann. Mag. Nat. Hist. (9) XVI, 1925, p. 513.

Long Petak, Punt D + 1172 metres 3 ♂, 3 ♀.

We regard *jentinki* as a rather distinct altitudinal form of *tenuis*, the Bornean lowland representative of which is *parvus*. Whitehead first found this squirrel on Kina Balu from about 3000 to 8000 feet and it has also been recorded from Long Akar (*vide* Lonnb. and Mjob. l.c.s.), Mt. Dulit (4000 ft., C. Hose) and Mt. Murud, on which latter mountain Mjoberg found it from 6500—7000 feet: at Long Petak it appears to live at the same altitude as *S. brookei*.

Measurements of adult ♂ in millimetres:—head and body 128, tail 126, ear 13 (from the flesh H.C.S.), hindfoot s.u. (from the skin) 33.

Skull:—greatest length 37, condylo-basilar length 29.6, palatilar length 14.9, least interorbital breadth 11.5, median nasal length 11, upper molar row (alveoli) 6.5, zygomatic breadth 22, mastoid breadth 16.

Particularly noticeable is the orange-washed area of the upperparts contrasting with the much colder tone of the flanks, and also the entire absence of any bright colour on the forelimbs and thighs so well marked in *tenuis* and *parvus*.

Excluding two specimens in which the colour has been altered by the action of spirit this is a very uniform series, the four unaltered specimens being almost identical on the upperparts. On the underparts two are slightly more buffy than the others, but never as in typical *tenuis*.

***Sciurus brookei* Thomas.**

Sciurus brookei Thomas, Ann. Mag. Hist. (6) IX, 1892, p. 253.

Tomeutes brookei Gyldenstolpe, Kungl. Sv. Vet. Akademiens Handlingar, Band 60, No. 6, 1920, p. 39.

Long Petak, Punt D + 1172 metres 1 ♀.

A single example which is rather paler than a topotype from Mt. Dulit, 3400 feet, and another from the Baram River, Sarawak.

This is a perplexing squirrel for we know of no other animal from the Malaysian subregion that is related to it.

It is a species whose affinities seems to be with *tenuis*, but it occurs side by side with it: it is larger than, and differs in colour from, the Sumatran submontane race of *tenuis*, viz. *S. t. modestus* Müll.¹

1. For measurements of *modestus* see Rob. and Kloss, Journ. F. M. S. Mus., VII, 1919, p. 318 et VIII, pt. 2, 1918, p. 40.

Measurements in millimetres:—head and body 162, tail 143, ear 14 (in the flesh H.C.S.).

Skull:—greatest length 44, condylo-basilar length 36, palatilar length 18, diastema 9.8, upper molar row (alveoli) 8.1, median nasal length 14.4, least interorbital breadth 15.2, zygomatic breadth 25.8.

The cranial measurements given by Gyldenstolpe (l.c.s.) are so large that we are inclined to doubt the allocation of the skull.

***Sciurus lowii lowii* Thomas.**

Sciurus lowii Thomas, Ann. Mag. Nat. Hist. (6) IX, 1892, p. 253; Lyon, Proc. U. S. Nat. Mus., XL, 1911, p. 91.

Tomeutes lowii lowii Gyldenstolpe. Kungl. Sv. Vet. Akademiens Handlingar, Band 60, No. 6. 1920, p. 39.

Long Hoet 1 ♀; Long Petak 5 ♂, 9 ♀; Long Petak, Punt D. + 1172 metres 1 ♀.

In some of these specimens the underparts are almost pure white, in others they are washed with yellowish buff; but this variation appears to be purely individual and not associated with any particular sex, age or season. We can see no differences between these animals and two from Sarawak.

***Nannosciurus melanotis pallidus* subsp. nov.**

Type:—Adult male (skin and skull), collected at Long Poes, Middle East Borneo, on 10th August 1925 by H. C. Siebers. Buitenzorg Museum No. 1178.

Diagnosis:—Like *borneanus*² but paler and greyer on the upperparts, the top of the muzzle and head rather less ochraceous and the pale head-stripes whiter and less tinged with buffy especially posterior to the ears. Nape patch smaller than in *N. sumatrana*³, top of muzzle and head paler.

External measurements of type:—Total length 126, head and body 66, tail 60, ear 7 (from the flesh, H.C.S.), hindfoot s.u. (dry) 22 mm.

Cranial measurements of type:—Greatest length 25.5, condylo-basilar length 21, basilar length 19, palatilar length 10.3, least interorbital breadth 10.9, zygomatic breadth 16.2, maxillary tooththrow (alveoli) 4 mm.

Specimens examined:—The type, and four others from Marah.

Remarks:—The type of *borneanus* came from Sanggau in Western Borneo, but this form has also been recorded by Lyon* from localities south of the Pasir River in South-eastern Borneo. With it we associate twenty-eight specimens before us from

2. Lyon, Proc. Biol. Soc. Wash., XIX, 1906, p. 54.

3. Id. t. c. s. p. 53.

* Id. Proc. U. S. Nat. Mus., 40, 1911, p. 97.

various localities in Sarawak from Kuching to Mt. Dulit. Without exception all of these latter have the head-stripe more buffy (especially behind the ear) and the head darker than any of the type series of the form described here.

Nannosciurus exilis exilis (S. Müller).

Sciurus exilis S. Müller, Tijdschrift voor Natuurlijke Geschiedenis en Physiologie, 1838, p. 148; Müller and Schlegel, Verhandl. Natur. Gesch., 1839-44, p. 87 et p. 97, Tab. 15, figs. 4-6.

Nannosciurus exilis Lyon, Proc. U. S. Nat. Mus. XXXIII, 1907, p. 558; id., op. cit., XL, 1911, p. 97.

Nannosciurus exilis exilis (? part.) Gyldenstolpe, Kungl. Sv. Vet. Akademiens Handlingar, Band 60, No. 6, 1920, p. 40.

Matoekai, Melawi, W. Borneo 1 ♀, 1 ?

This species was originally recorded from Malacca, Sumatra and Borneo but at least the first of these localities is erroneous for no member of the genus occurs in the Malay Peninsula: it is furthermore significant that although this seems to be a common squirrel wherever it is found in Borneo it is absent in recent collections from Sumatra. The presence of representatives in the Sulu and Philippine groups also suggests that the occurrence of the species in Southwestern Malaysia is improbable.

If the squirrel does occur in Sumatra the type is the animal figured by Müller and Schlegel (l.c.s.) which, *vide* Jentink (Catalogue Systematique des Mammifères, 1888, p. 23) is from Sumatra ("Mont Singalang") but we do not believe in the presence of *exilis* in that island. It seems never to have been recorded thence except by the describer in days when the localities given were often incorrect. Therefore we select the Kapuas River basin in Western Borneo as the type locality, chiefly because animals from Western Borneo are in closer agreement with the original description than are specimens from Eastern Borneo; but also because it is probable that the type series came from thereabouts. The colour of the unsexed specimen before us has been altered by the action of alcohol but the female differs from specimens from Middle Eastern Borneo (*vide infra*) and agrees with the type (*cf.* Anderson, Zool. Res. Yunnan, 1878, p. 257) in that the upperparts are suffused with rufous.

The figure on the coloured plate mentioned above is too generalised in character to permit of a detailed comparison.

Nannosciurus exilis sordidus subsp. nov.

Type.—Adult female (skin and skull) collected at Long Temelan, Middle East Borneo on 26th August 1925 by H. C. Siebers. Buitenzorg Mus. No. 1189.

Diagnosis.—Like *N. exilis* of Western Borneo but the upperparts duller and more olive in tone and the cinnamon-rufous tinge much reduced. Our series from Sarawak shows that these differences are not seasonal.

External measurements of type:—Total length 122, head and body 70, tail 52, ear 10 (from the flesh H.C.S.), hindfoot s.u. 22 mm. (dry).

Cranial measurements of type:—Total length of skull 23, condylo-basilar length 19, basilar length 17, palatilar length 9.5, least interorbital breadth 9.4, zygomatic breadth 15, maxillary tooth row (alveoli) 3.3 mm.

Specimens examined:—Long Hoet 5 ♂, 1 ♀; Long Temelan 1 ♂, 2 ♀; Long Liah Leng 1 ♂; Long Petak 10 ♂, 8 ♀. Our description is, however, based on only four of this series (compared with nine specimens from various parts of Sarawak and two from Melawi, West Borneo), for most of the skins have been radically altered in colour through preliminary preservation in alcohol, the chief effect of which has been to produce a pronounced pinkish buff wash on the underparts and to deepen the naturally ochraceous tone of the upperparts into a warm brown. It is by no means obvious that the colours have been altered for the action of alcohol produces a highly "natural" tone and thereby a pitfall for the unwary!

***Rattus surifer bandahara* Robinson.**

Rattus bandahara Robinson, Ann. Mag. Nat. Hist. (9) VII, 1921, p. 235. [Kina Balu].

? *Mus rajah* Lyon, Proc. U. S. Nat. Mus., XXXIII, 1907, p. 558.

? *Epimys rajah* Lyon, op. cit. XL, 1911, p. 107.

Long Petak 2 ♀; Long Petak, Punt D+1172 metres 1 ♀.

Two examples agree with the type description; but the third, from the higher locality, is darker above and lacks the broad zinc-orange gorget.

All Bornean rats of this section have been recorded as *rajah*, but Robinson has stated (l.c.s.) that *rajah* has, as analogue, the Malayan *pellax* and not *surifer*. Until *bandahara* was described only one species was recognised from the island though it is now obvious that in his "Rough Synopsis" [Ann. Mag. Nat. Hist. (6) XIV, 1894, p. 451] Thomas included two under *Mus rajah* sp. nov. ("colour varying from isabelline to rufous"): in his "Detailed Diagnosis" (t.c.s. p. 454) the first species is described and the type cited (colour a dull rufous clay-colour. The animals of "rufous" colour are probably the present form.

We take the opportunity of correcting two errors in a previous number of "Treubia":—Vol. II, Livr. I, 1921, p. 123—line 19, reverse "*Rattus surifer surifer*" and "*R. s. bandahara*"; line 25 for "*R. rajah*" read "*R. surifer*."

***Rattus whiteheadi* (Thomas).**

Mus whiteheadi Thomas, Ann. Mag. Nat. Hist. (6) XIV, 1894, p. 457.

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Mus whiteheadi perlutus Thomas, op. cit. (8) VII, 1911, p. 205.

Epimys whiteheadi Lyon, Pro. U. S. Nat. Mus., XL, 1911, p. 106.

Rattus whiteheadi Robinson and Kloss, Journ. Fed. Malay States Mus., VIII, part 2, 1918, p. 50.

Rattus whiteheadi whiteheadi Gyldenstolpe Kungl. Sv. Vet. Akademiens Handlingar, Band 60, No. 6, 1920, p. 42.

Long Petak 1 ♀; Long Petak, Punt D+1172 metres 1 sex? Both are rufous-bellied examples.

Rattus cremoriventer kina (Bonhote).

Mus kina Bonhote, Ann. Mag. Nat. Hist. (7) XI, 1903, p. 124.

Epimys kina Lyon, Proc. U. S. Nat. Mus., XL, 1911, p. 111.

Rattus kina Gyldenstolpe, Kungl. Sv. Vet. Akademiens Handlingar, Band 60, No. 6, 1920, p. 42.

Long Petak 2 ♀.

Rattus concolor ephippium Jentink.

Mus ephippium Lyon, Proc. U. S. Nat. Mus., XXXIII, 1907, p. 558.

Epimys ephippium Lyon, op. cit., XL, 1911, p. 98.

Lebong Hara, Melawi, W. Borneo 3 ♂, 5 ♀.

Marah 1, ? Sex.

Rattus rattus neglectus (Jent.)

Epimys neglectus Lyon, Proc. U. S. Nat. Mus., XL, 1911, p. 98.

Marah 1 ♀.

This Malaysian field rat is, we believe, the animal described from Banjamassin by Jentink. Underparts white, or creamy, sharply defined from the brown upperparts.

Rattus rattus diardi (Jent.)

? *Epimys rattus turbidus* Miller, Smith. Misc. Coll. LXI, No. 21, 1913, p. 12.

Rattus neglectus (? part.) Gyldenstolpe, Kungl. Sv. Vet. Akademiens Handlingar, Band 60, No. 6, 1920, p. 44.

Nangah Serawai, Melawi, W. Borneo 2 ♀.

Tenggarong 2 juv.; Moeara Antjaloeng 1 ♂, 1 ♀; Sungei Telaga 2 ♀; Marah 3 ♂, 6 ♀.

All the specimens listed above are examples of the very variable Malaysian house-rat (vide Kloss, Treubia, II, 1921, p. 120). We suspect that *turbidus* Miller, also from Tenggarong, which is described as like *neglectus* but with the underparts a dull drabby grey, is the same.

Rattus argentiventer (Rob. & Kloss)

Epimys rattus argentiventer Rob. & Kloss, Journ. Straits Branch, Roy. Asiatic Soc., No. 73, 1916, p. 274; id., Journ. F. M. S. VIII, Part 2, 1918, p. 55.

Moeara Antjaloeng 1 ♀.

Although the type of *argentiventer*, which came from Pasir Ganting on the west coast of Sumatra, is unique and is not available for comparison, we have used the name for the present specimen because it agrees so well with the original description.

The back of the skull is badly smashed but there remain the marked cranial characters in which *argentiventer* differs from *neglectus* viz. longer toothrow, larger and more dilated bullae, longer palatal foramina which extend posteriorly beyond a line joining the inner anterior roots of the front molars, considerably broader infraorbital plate. The tail is shorter than the head and body, 174:157 in the flesh. The hindfoot (s.u.) measures 34 mm. in the dried skin.

This rat bears a strong superficial resemblance to the members of the *rattus* group, and was indeed described as a member of that formenkreise.

Rattus muelleri borneanus (Miller).

Epimys borneanus Miller, Smith. Misc. Coll. LXI, 1913, p. 15.

Rattus muelleri Gyldenstolpe, Kungl. Sv. Vet. Akademiens Handlingar, Band 60, No. 6, 1919, p. 43.

Lebong Hara, Melawi, W. Borneo 2 ♀.

Long Temelen 1 ♂, 1 ♀; Long Petak 2 ♂, 6 ♀, 1 juv.

The Eastern series varies a great deal in age and consequently in colour. A very young animal is white beneath, and the range is thence through greyish white and greyish buff in immature animals, to adults with deep buff (chamois) underparts to creamy in the largest and oldest specimen (with worn teeth) which measures:—Skull: greatest length 54, condylo-basilar length 46, palatilar length 25, median nasal length 21, zygomatic breadth 27, upper molar row (alveoli) 8.5. This is by far the largest skull of the series the next in size measuring only 51.5 at its greatest length.

We have placed these large rats as a form of *muelleri*. We have considered *infraluteus* Thomas, but that seems to be the analogue of *validus* Miller, from the Malay Peninsula. Though described in 1888 no zoologist seems to have referred material to it except Gyldenstolpe who in 1920 determined a rat from the Boeloengan River as *infraluteus* and some others from the same place as *muelleri*. The first had the underparts dirty greyish buff with dark grey under-fur. The others, slightly smaller, were whitish buff below to the roots of the hair. These latter are probably the same as those now before us.

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The two examples from Melawi, West Borneo, are both creamy beneath. A specimen from Saribas, Sarawak is creamy, strongly washed with chamois on the thighs and sides of the abdomen and is more brightly coloured above than any of the others.

Chiropodomys sp.

Long Petak 1 ♀.

This specimen differs from all the described forms of *Chiropodomys* in that the underside is not white, but fawn colour like the upperparts except for a small white patch on the middle line of the throat.

In view of the fact that four *Chiropodomys* have now been described from Borneo it is inexpedient to base another name on a single example.

In size our animal comes nearest to *pusillus* Thomas, from Kina Balu, 1000 feet, its skull proportions closely agreeing with the measurements of the type [A. M. N. H. (6) XI, 1893, p. 345] and our specimen further has entirely white hands and feet.

Head and body 69, tail 89, ear 13 (all from the flesh: H. C. Siebers), hindfoot s.u. 16 (from the skin).

Skull: condylo-basilar length 18, palatilar 9 (+), zygomatic breadth 13, breadth of braincase 11.6, interorbital breadth 4.9, interparietal length 4.7, anterior zygoma-root 2, diastema 5.9, anterior palatine foramina 2.6, combined lengths m^1 and m^2 (crowns) 2.5, upper molar row (alveoli) 3, length of lower molar series 3.2.

INSECTIVORA.

***Tupaia glis salatana* Lyon.**

Tupaia longipes salatana Lyon, U. S. Nat. Mus., XLV, 1913, p. 77; Gyldenstolpe, Kungl. Sv. Vet. Akademiens Handlingar, Band 60, No. 6, 1920, p. 19.

Tupaia longipes (part.) Lyon, op. cit., XL, 1911, p. 122.

Lebong Hara, Melawi, W. Borneo 1 ♂.

The type of this form came from the Pangkallahan River, S.E. Borneo (15 miles from mouth) and it is thence found along the south coast to the Kendawangen River on the west coast. The present specimen which on description (and by comparison with *longipes* from Sarawak) seems to us to be *salatana* therefore extends the range of the form to the north.

A juvenile (No. 1035), also from Melawi, possibly belongs to this race.

***Tupaia minor minor* Günther.**

Tupaia minor Günther, Proc. Zool. Soc. London, 1876, p. 426; Lyon, Proc. U. S. Nat. Mus., XL, 1911, p. 123; Gyldenstolpe, Kungl. Sv. Vet. Akademiens Handlingar, Band 60, No. 6, 1920, p. 20.

Lebong Hara, Melawi, W. Borneo 1 ♂.

Moeara Antjaloeng 1 ♂; Marah 1 ♀; Moeara Wahau 1 ♂; Long Petak 4 ♂, 7 ♀.

Some examples of the series are rather whiter below than others and the underside of the tail can be either buffy or grey in general tone. The specimens before us vary considerably in the colour of the tail above and the amount of russet wash on the upperparts. In one adult ♂ the russet colour is absent and in several the tail is concolorous with the back: *malaccana* Anderson, from the Malay Peninsula seems a very thin race based on average characters only.

***Tupaia gracilis gracilis* Thomas.**

Tupaia gracilis Thomas, Ann. Mag. Nat. Hist. (6) XII, 1893, p. 53; Lyon, Proc. U. S. Nat. Mus., XL, 1911, p. 123.

Lebong Hara, Melawi, W. Borneo 2 ♂. (Nos. 1037, 1038).

***Tupaia dorsalis* Schlegel.**

Tupaia dorsalis Schlegel, Handl. Beoef. Dierk., 1857, p. 59, pl. 3, fig. 31; Lyon, Proc. U. S. Nat. Mus., XXXIII, 1911, p. 562; id., op. cit., XL., 1911, p. 121.

Tana dorsalis Lyon, op. cit., XLV, 1913, p. 152; Gyldenstolpe, Kungl. Sv. Vet. Akademiens Handlingar, Band 60, No. 6, 1920, p. 23.

Long Petak 1 ♂, 3 ♀.

Orchid pollination Notes.

by C. E. CARR.

(With plates V to XVII).

***Dendrobium crumenatum* (Sw.) or Pigeon Orchid.**

The flower has a strong sweet scent and readily attracts various species of bees by whose agency it is pollinated. The plant flowers at intervals of a few weeks throughout the year, while the flowers are only in full bloom for one morning, commencing to close about midday. It is an interesting fact that while the periods between blooming are of quite irregular duration all plants flower on the same day.

The method of pollination is simple. The column is long and its sides are embraced by the side lobes of the lip forming, with the mentum, a kind of tube. Down the centre of the

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column runs a thickened ridge the base of which is very much swollen, orange in colour, and is pierced by the bee for its juices. It frequently secretes honey. The honey-secreting portion of the ridge lies in a small chamber at the base of the column which collects the honey. The secretion of honey commences before the flower opens by which time it will have overflowed the small chamber and formed a large drop at the base of the lip petal. The lip is not closely appressed to the column and is easily depressed by the weight of the insect landing upon it. The front of the upper surface of the rostellum contains a patch of pasty substance covered by a thin layer of cells and protected from above by the lip of the anther.

As a bee backs its way out of a flower the lip, which has been wedged wide open, commences to close back towards the column till it causes the thorax of the bee to come into contact with the area of paste-like substance on the rostellum. The covering layer of cells instantly ruptures and the upward pressure raises the lip of the anther and forces the paste into it where it adheres to the pollinia. Some also becomes glued to the thorax of the bee which therefore, as it continues to retreat, carries the pollinia with it. The pollinia are four in number and are usually all withdrawn together.

When, after a visit to another flower, the insect commences to withdraw, the pollinia are forced into contact with the stigma on the surface of which they are retained. The side lobes of the lip act as a guide to the bee and ensure that it always takes up a certain fixed position in each flower. The figures quoted below will show the accuracy with which the pollinia are placed upon the stigma.

The accompanying figures will also show that the flowers of this orchid cannot be fertilized by pollen from other flowers of the same plant. They represent observations on a single plant which was growing fully half a mile away from any others and the hive of bees observed was only a few yards distant. The figures were taken over 5 different flowering periods.

No. of Flowers.	Flowers with pollinia removed.	Flowers with pollinia on stigma.	Capsules.
206	165	129	0

It will be seen that not one single capsule resulted from 129 flowers in which the action of pollination had been properly carried out but only with pollen from the same plant. Where, however, flowers receive pollen from others belonging to distinct plants capsules will invariably result.

Even where many plants grow together the percentage of capsules to flowers is not large, due to the fact that an insect visits in succession all or at any rate most of the flowers of the plant before visiting the next, and in this way the great majority of flowers receive pollen from other flowers of the same plant.

Dendrobium truncatum (Lindl.)

The general structure of the flower is tubular resembling in this respect the allied *D. gracile*, *D. clavator* and *D. planibulbe*. As also with the species quoted pollination is effected through the agency of small bees. During the heat of the day it emits a fairly strong scent of the Hawthorn (*Crataegus* sp.). Owing to the form of the mentum the flowers do not expand widely.

The upper sepal and petals are set close side by side forming a hood which droops over the anther and thus together with the mentum they cause the whole flower to resemble an arch at the apex of which is situated the ovary. The lateral sepals are large and their bases are prolonged backwards to form with the column and lip a long tube.

The lip petal is adnate to the base of the column and occupies a position close to and nearly parallel with it. It is three-lobed. The midlobe is short and narrow and is decurved to form a landing place for the insect. At the base of the midlobe is a large orange callus or wall which projects forwards over the former and occupies the whole width of the lip between the side lobes.

The side lobes, which are white veined with purple, are large and stand nearly upright. They form additional sides to the groove mentioned above and project well forwards on each side of the column. They ensure not only that an insect must mount over the callus at the base of the midlobe in order to reach the base of the tube, but must move backwards over the callus till the midlobe is reached, on withdrawal.

From the callus to its base the blade of the lip is thickened to assist it in retaining as far as possible its position close to and parallel with the column.

The column is considerably lengthened downwards to form, with the lateral sepals, a long narrow tube. Near its base is a small orange cushion which does not secrete honey but is greatly sought by insects for the juices contained within its tissue.

The stigma is shallow and is situated immediately below the rostellum. At the apex of the latter are two lobes above which is the area of paste common to the plants of this genus. The function of the two lobes of the rostellum, which hang down slightly over the stigma, is to catch the pollinia attached to the thorax of the insect and guide them on to the viscid surface.

When a small bee of suitable size approaches a flower it lands upon the small depending midlobe of the lip which it commences to climb. It is now within the forward projecting side lobes of the lip so that when the base of the midlobe is reached it is forced to climb directly over the callus which is situated immediately below the anther, for it will be remembered that this callus occupies the whole width of the lip between the side lobes.

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As it rises its head comes into contact with the anther and as the space between this, and the callus is too small to permit of free entrance the insect forces open the apex of the lip by leverage with head and thorax on the anther. Having passed the callus the insect is now free to penetrate to the base of the tube and attack with its maxillae the cushion of juicy tissue situated near the base of the column.

When the juices in the cushion have been exhausted, a few seconds suffice for this, the bee commences to back its way up the tube until the slope of the callus is reached.

As the callus is ascended its slope causes the base of the thorax to press against the lip of the anther raising it away from the rostellum. The centre of the insect's thorax now comes into contact with the patch of paste above the lobes of the rostellum. This paste is immediately forced out through its covering layer of cells into the anther where it engages with the pollinia. A considerable quantity is also smeared upon the centre of the insect's thorax to which the pollinia therefore adhere on further withdrawal. This paste dries with great rapidity to the consistency of wax on exposure to the air and the pollinia are consequently firmly held in place upon the centre of the thorax.

On withdrawal from a second flower the pollinia are caught by the two lobes of the rostellum which force them inwards to the surface of the stigma and tear them away from the thorax of the insect.

Further withdrawal results in the pollinia of the second flower being carried away in the manner shown above.

As mentioned previously the allied plants *D. gracile*, *D. clavator* and *D. planibulbe* are pollinated in the manner shown above. They all partake of the same essential structure as just described. All are tubular, all have similar cushions near the base of the column and the mechanism of the callus, anther and side lobes of the lip are common to all.

The flower has no protection against other insects such as ants, butterflies etc., and the cushion of juicy tissue at the base of the column is so soft as to be easily penetrated by the maxillae of the latter. I have however repeatedly observed flowers to be visited by bees after previous visits by butterflies which insects are of course useless for pollination purposes.

***Dendrobium pandaneti* (Ridl.)**

This species is of great interest by reason of the presence, in addition to the ordinary anterior anther, of two lateral anthers of the inner whorl.

The anterior anther is complete, having two cells each containing two pollinia, but it plays no part in the fertilization of the flower. The act of fertilization is effected entirely by the

pollinia from the lateral anthers, which consist each of one cell containing two pollinia and it is usually well advanced before the flower opens. The flower does not expand widely when it opens at all and I have never observed it to be visited by insects.

The lateral anthers being situate on each side of the stigma and below the rostellum their pollinia are drawn out over the surface of the stigma, throw out pollen tubes and fertilize the flower. They become entirely merged with, and inseparable from, the stigma.

As in the other species of this genus the rostellum is provided with the usual patch of paste-like substance covered by a thin layer of cells and the pollinia in the anterior anther can be removed in the ordinary way but in none of the many flowers examined by me has this been actually done, all being fertilized by the pollinia from the incomplete lateral anthers. The pollinia in the anterior anther remain to perish in their cells.

The species may be found growing low down on Rembia palms in and around rice fields. In such situations the plant is fully exposed to the sun but the roots penetrate through the fibrous bases of the old leaves to the moisture within.

Owing to the restricted nature of its habits the plant is naturally a very local one being common in the rice fields in which it has become established though absent in suitable areas some little distance away, for while every flower produces a capsule the seeds are seldom able to negotiate any wide belt of forest or cultivated land. As an example of this the plant is abundant in the rice fields of the Rembau and Johol valleys in Negri Sembilan while it appears to be very rare or absent from Malacca territory.

It may be found in flower continuously throughout the year.

***Dendrobium metachilinum* (Rchb.)**

The flowers are borne on very short racemes usually in pairs with the sepals and petals widely expanded, the lateral sepals forming at their base a long straight and very narrow spur-like mentum. This mentum is about half an inch long and over the greater part of its length only one twentieth of an inch wide.

The lip petal is long and narrow and closely appressed to the column at the summit and base of the foot of the latter. It is three lobed the two small and pointed side lobes closely gripping the column immediately beneath the anther. The midlobe is somewhat decurved and its edges are very fleshy.

Along the blade of the lip, from its base to the side lobes, are two large keels with a narrow groove between them. These keels press tightly against the anther and together with the side lobes of the lip completely close the entrance to the flower with the exception of the narrow groove between them.

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On the blade of the lip, and particularly on the two keels, are layers of white oval starch grains arranged in lines placed loosely side by side. These starch grains provide food for the insect visitors and are developed in their greatest abundance on that part of the lip which is immediately below the anther and stigma.

The column is short and straight and forms a half right angle with the blade of the lip while the column foot is at right angles to the column. Thus a space is left between lip and column immediately in rear of the anther forming an arched chamber the sides of which are tightly closed by the side lobes of the lip. In the forward arch of this chamber is situated the deep stigmatic cavity. It is precisely on that portion of the lip which forms the floor of this chamber that the starch grains reach their greatest development.

At the apex of the rostellum and protruding slightly below the lip of the anther is the usual patch of paste-like substance common to flowers of this genus. This paste is easily forced out by a slight upward pressure. Though the anther is large its two cells are very shallow and the pollinia rest therefore just above the area of paste on the rostellum in such a position that they cannot fail to be caught when the paste is forced out.

I am unable to say by what insect the flower is fertilized as I have never seen it visited by insects nor have I ever seen a capsule naturally formed. At first sight it would appear from the tubular nature of the flower, the closed entrance with its narrow groove between the keels of the lip and the long narrow spur-like mentum that the agency of lepidoptera would be required, and indeed it is possible that this might at one time have been the case. There is, however, no thickened area at the base of the lip or column foot which might provide the juices attractive to these insects. Moreover the situation of the rostellum and stigma high up on the forward slope of the chamber formed by column and lip would render it impossible for the pollinia to be extracted by the maxillae of a moth.

On the other hand the high position occupied by rostellum and stigma, the chamber between column and lip on the floor of which is such a large store of easily available food both point to fertilization by other types of insects. Moreover the lip, as far back as the base of the column foot is flexible and easily wedged open giving ready access to the chamber.

Any insect strong enough to wedge open the lip and gain access to the chamber would be certain, on withdrawal, to come into contact with the area of paste on the rostellum. This would immediately be forced out and glue the pollinia to the head or thorax of the insect. Moreover the position of the stigma on the

forward arch of the chamber is excellently adapted for the trapping of the pollinia as the insect withdraws from the next flower visited.

Though there are usually two flowers on each raceme they do not expand at the same time, one opening a few days before the other. This is of importance in rendering it unlikely that any one flower would be fertilized by pollinia extracted from another flower of the same plant. The precaution, however, is not complete in so far as both flowers will be expanded together for several days before the first withers.

The flowers have no scent nor do they secrete nectar and the plant may be found in flower throughout the year.

***Dendrobium secundum* (Lindl.)**

The general shape of the flower is tubular and fertilization is effected by means of moths. The upper half of the lip rests close to the column while its sides are incurved to fit tightly over the anther and the column arms. Its lower half is bent sharply outwards to form, with the mentum, an enclosed dilated chamber at its base which becomes filled with nectar while at the bend it is much thickened to cause the whole upperhalf to be rigidly appressed to the column. The apex of the lip projects above the anther and its sides are incurved to such an extent that they almost meet and form a narrow guide-entrance to the interior of the flower.

The arms of the column are rounded and form the sides of a tube which acts as a guide to the maxillae of the insect when inserted in order to reach the nectar-containing chamber below. This tube is completed by means of the blade of the lip whose incurved sides, as noticed previously, fit tightly over the column arms.

The rostellum is interesting and plays a very important part in the fertilization of the flower. On its upper surface, immediately beneath the lip of the anther, which protects it from downward touch, is a small patch of yellowish paste covered by a thin layer of cells which rupture at the slightest upward pressure. Its under surface is prolonged downwards into two tooth-like lobes or, 'hooks' which project over the small sunken stigmatic cavity well out into the tube formed by the column arms and the blade of the lip.

Thus the entrance to the tube, formed by the incurved sides of the apex of the lip, the tube itself, formed by the column arms and the blade of the lip, and also the sharp outward curve of the nectar-containing chamber all combine to assure that the insect takes up the same relative position to each flower, i.e. exactly opposite to it, since it would be impossible for the maxillae to penetrate to the basal chamber from any other position. This is also assisted by the tooth-like lobes on the under surface of the

rostellum between which the maxillae must be inserted. The pollinia, therefore, will always become attached to the front of the maxillae.

As the maxillae are withdrawn they raise the anther and rupture the layer of cells which covers the mass of paste on the upper surface of the rostellum. This paste is forced up into the anther and adheres both to the base of the pollinia, which have neither caudicle nor disc, and to the maxillae which, as they are further withdrawn, carry the pollinia adhering to them. The paste sets in a few seconds into the consistency of soft wax, and the mere slight raising of the anther is usually sufficient to rupture the covering layer of cells.

When, after the insect's visit to the next flower, the maxillae are again withdrawn the pollinia which are adhering to them are caught by the lobes of the under surface of the rostellum and forced upwards and inwards to the face of the stigma on whose viscid surface they remain, while fresh pollinia are removed in the manner shown above.

The nectar secreted by the flower is well protected from attack by insects other than the lepidoptera required for fertilization since the entrance to the interior is too small to render access possible even to the smallest ants. These may be seen crowding over the flowers and endeavouring to reach the nectar from the slits between the edges of the lip and the lateral sepals.

The plant may usually be found in flower in Malaya in February, March and April. The season is a short one but the plant makes a very attractive show with its racemes of closely packed deep rose coloured flowers. A white variety may occasionally be found among the other plants.

***Bulbophyllum epicrianthes* (Hook.)**

The flowers appear singly from the large sheathing bracts at the base of the pseudobulbs. They are widely expanded, the large yellow and red sepals being bent back upon the ovary and pedicel. The general colour is red and yellow, colours attractive to the small flies necessary for pollination. The petals are extremely short and each ends in some 6 to 8 small grey processes which are connected to the petal by long slender filaments causing them to oscillate continually at the slightest movement or in the smallest breadth of air. Actually, as will be explained, the mechanism of the lip petal is such as to render the presence of the other two petals unnecessary. In this species it is obviously of advantage that the lip petal and column are left fully exposed in the centre of the flower in the manner shown in the illustration. It appears therefore that the lateral petals became gradually aborted and that they have been later adapted to their present form. It is certain that the small blades are of benefit to the plant since by their continual movement they undoubtedly provide

a means of attraction of insects and they are so small that they do not, even in violent movement, disturb the small flies which settle on the lip. Moreover the blades are obviously specially developed organs and are by no means analogous to hairs nor are they mere continuations of the veins of the petals. They themselves resemble small linear petals and are connected to the petals proper by long filamentous projections of the latter.

The lip petal plays a most important part in the fertilization of the flower. It is tongue shaped and rounded with a pointed tip and is attached by a delicate hinge to the column foot whence it hangs downwards. The delicate manner of its attachment to the foot of the column causes it to swing easily backwards and forwards. In colour the basal half is greenish with dark red spots while the apex is dark red almost black. At the base of the upper surface the lip is bilobed the lobes enclosing a large hollow along the bottom of which runs a long very narrow groove. Running transversely down the sides of the base of the lip are two rows of red and yellow tubercles widening to a mass on the under surface just under half way down. These tubercles are provided with a hard shiny covering and exactly resemble small glistening drops of liquid, a further attraction to insects. From the numerous pores in the hard coating of the tubercles, in common with the whole of the upper surface of the lip, exude countless minute drops of fluid which are eagerly sucked up by the small flies which visit the flower. The fluid is often secreted before the flower opens and masses of sugar may sometimes be found among the tubercles. The lip petal possesses the additional function of exuding the very faint foetid smell so attractive to many kinds of flies. The small groove in the bottom of the cavity enclosed by the lobes at the base of the lip is of much importance. Small drops of secreted liquid collect in this groove and are led down it to a small chamber close to the hinge attaching the lip to the foot of the column. This collection of easily obtainable liquid attracts the insect to probe its way to the very base of the lip a position which it is necessary for it to occupy in order that the pollinia may be withdrawn.

The column, to whose foot the lip is hinged, is provided with long wide arms which form a groove within which swings the base of the lip. In this position the stigma is situate above and slightly in front of the hollow formed by the basal lobes of the lip. Just above the stigma is the rostellum which is furnished with a small patch of paste-like substance covered by a layer of cells through which it is easily forced out by an upward thrust.

A small fly on landing upon the lip wanders about in search of the drops of liquid secreted upon the tubercles and the upper surface. Sooner or later it reaches the central groove near the base of the lip which it gradually follows. Its head and thorax now come into contact with the sides of the stigmatic chamber.

It cannot yet enter the hollow between the basal lobes of the lip the entrance to which approaches too near to the column face. The lip, however, being balanced on a delicate hinge now commences, in response to leverage against the face of the column, to move backwards and downwards until the hollow between its basal lobes becomes accessible to the insect which moves further downwards till it is enabled to reach the small chamber close to the hinge of the lip. The lip has now been forced into the second position shown while the thorax of the insect is immediately below the stigma.

As the insect commences to withdraw the lip presses upward in the endeavour to resume its normal position and by this pressure the thorax of the insect is kept tightly pressed to the face of the column and the sides of the stigmatic chamber. On further withdrawal therefore the centre of the thorax presses upwards against the area of paste on the rostellum. This paste is immediately forced out into the anther and adheres to the pollinia. Some of the paste is also smeared upon the thorax of the insect to which the pollinia consequently adhere and by which they are withdrawn.

On withdrawal from the next flower penetrated the upward pressure of the lip petal forces the pollinia attached to the thorax of the insect into the narrow stigmatic opening while fresh pollinia are extracted as before.

***Eria floribunda* (Lindl.)**

The flowers are crowded in short racemes produced among the leaves at the top of the stems. They do not expand very widely and are pollinated by bees.

The lateral sepals are very wide and are not widely expanded. They form walls which tend to keep the insect in the centre of the flower. The lip petal is adnate to the base of the long column foot. It is slightly saccate at the base to form with the base of the column foot a small chamber which becomes filled with nectar. The sides of this chamber are closed by the side lobes of the lip whose apices also press tightly against the column foot so that they must be levered open before access to the chamber can be gained. The midlobe of the lip is long and spoon-shaped. It merely serves as a platform whence the insect may enter the flower.

The stigma is very prominently placed and lies well out above the midlobe of the lip. It is large and faces rather downwards towards the apex of the lip.

Above the stigma is the rostellum with a broad beak to each side of the apex of which is attached a very small glistening yellow disc. To each of these discs, which are highly viscid, are attached four pollinia. The discs are held to the remainder of the rostellum by means of a layer of very delicate cells which rupture instantly if the discs be pressed upwards.

The fact that the discs are situated on each side of a rather wide rostellum beak renders it possible that they can be withdrawn one at a time, and this very frequently happens. This is also assisted by the fact that down the centre of the rostellum beak runs a low ridge. Obviously this is of no little advantage to the plant in that it renders it possible for the pollinia of one flower to pollinate two or more blooms.

On visiting a flower the bee alights on the midlobe of the lip, and proceeds to wedge open the side lobes with its maxillae in order to reach the fluid contained within the basal chamber. In order to do this it must keep its head pressed tightly against the column in such a manner that the apex of the rostellum beak bears approximately upon the centre of the head.

On withdrawal the head brushes upwards against the under side of the discs which adhere and the cells which unite them to the rostellum being instantly ruptured by the upward pressure, they, with their pollinia attached, are withdrawn. Either both sets of pollinia or only one would be withdrawn according to whether the bee occupied a directly central position or one slightly to one side. Moreover it is frequently the case that the basal joint of one of the antennae raises a disc which would in this case be removed adhering to the antenna.

The pollinia on removal assume a drooping position. This is not due to any contraction of the disc but merely to the manner in which the pollinia are attached to it. Moreover this position is essential for pollination since it would not otherwise be possible for the pollinia to gain contact with the stigma.

When the bee enters another flower, and assumes the position described above, it will be seen that the drooping of the pollinia brings them exactly over the face of the stigma against whose viscid surface they press. As the bee withdraws from the second flower therefore all or at any rate some of the pollinia are left upon the stigma while fresh pollinia are withdrawn as previously shown.

The elasticity of the minute filaments attaching pollinia to caudicles or discs is a further contrivance for economy in expenditure of pollen. In the present plant these filaments are highly elastic and it frequently happens that only one or two pollinia are actually left upon the stigma, their filaments being ruptured by the rostellum beak, while the others are withdrawn from the stigma and serve to pollinate another plant.

In addition to the common species of honey bee whose part in the pollination of this plant has been described above, the flowers are visited eagerly by many species of bees and wasps in addition to other useless insects such as flies, ants etc. Only in a few cases, however, are these insects of any use in pollination. Thus a large wasp observed only removed one set of pollinia after visiting upwards of thirty flowers.

Moreover the plant offers no protection to unwanted insects but this is counteracted by the fact that nectar is continuously secreted in the chamber at the base of the lip.

The plant, which is the commonest of the *Hymeneria* section, has, together with many of the genus, a very restricted flowering period, being usually in bloom in Malaya in December or January. The actual duration of a plant in bloom lasts only a few days.

Dendrocolla alba (Ridl.)

The flowers expand singly or in pairs in early morning at intervals of about ten days and remain fully expanded till mid-day or early afternoon. They are pollinated by small bees.

The sepals and petals which are white or more commonly cream in colour are widely expanded. The lip petal, which is pale yellow with light brown blotches, occupies the centre of the flower completely covering the column with which it is more or less parallel. Together with the column and the column foot it forms a tube ending in a spur-like sac. The side lobes are curved and furnished with hairs. They fit closely round the sides of the column.

On the blade of the lip, immediately below the anther, is a small projection or callus, while at the base of the lip is a light brown swelling which is pierced by the insect for the juices which fill its tissue.

The column is short with rounded arms which, with the rostellum, form an arch over the stigmatic cavity and on the centre of this arch rests the disc of the rostellum.

The disc, to which the pollinia are directly attached, there being no caudicle, is separated from the rest of the rostellum by the usual line of rupturing cells, thus permitting it to be readily withdrawn, together with the pollinia, by any object to which its viscid under-surface becomes attached. The anther is usually withdrawn with the pollinia but becomes dislodged by the slightest friction.

The bee effects entrance between the lip petal and the column making its way down the tube, guided by the side lobes of the lip, till it reaches the callus. This projection causes the insect to rise away from the surface of the lip till its thorax presses against the anther and the upper or smooth surface of the disc.

As the insect commences to back its way out of the tube, however, its thorax rubs against the viscid under surface of the disc which immediately adheres to it, and, the upward pressure rupturing the bordering line of cells, the disc and pollinia are withdrawn.

On withdrawal from the next flower visited the pollinia are caught by the lower lip of the rostellum and forced upwards and inwards on to the stigma upon whose viscid surface they adhere, while fresh pollinia are withdrawn in the manner shown above.

As shown by the accompanying figures the plants growing in shady situations are more frequently visited than those growing in the open. The small proportion of capsules to flowers with pollinia removed may be in part due to the fact that the small bees on which the plant depends for pollination appear to be most easily disturbed. I have frequently observed bees, with pollinia attached, visiting flowers only to leave without entering them. In such cases, should they visit meanwhile totally different species these pollinia might easily become dislodged before they had had the opportunity to pollinate any flowers.

The following figures may be of interest also in showing roughly the rate of capsules to flowers.

	No. of Flowers with Flowers pollinia removed Capsules.		
Group 1. (Fully exposed to sun)	62	15	4
Group 2. (On shady shrub)	38	29	8
	<hr/> 100	<hr/> 44	<hr/> 12

***Coelogyne mayeriana* (Rchb.)**

The flowers, which are coloured yellow-green with the lip petal veined and spotted with black, are strongly scented of Privet (*Ligustrum*). They are pollinated by wasps, and are widely expanded with the lip presenting a ready landing place for the insects. Before pollination the flower is erect but one day after this has been effected it assumes a drooping posture making it very difficult for a large insect, such as here required, to enter. The scent is still retained, however, as an increased attraction to insects to visit the plant.

At the base of the lip is an orange swelling which is punctured by the maxillae of the insect for the juices contained within, while down the centre of the lip for its whole length run two raised ridges which reach their greatest height immediately below the anther. These act as guides and ensure that the insect must keep to the exact centre of the flower in order to reach the swelling at the base of the lip.

The rostellum projects considerably above the stigma while the column is furnished with two large wings which form a groove to guide the head of the insect on withdrawal. At the apex of the rostellum is a small area called the disc. This area is marked off from the remainder of the rostellum by a layer of delicate and easily ruptured cells which break at the slightest upward

pressure. To the upper surface of the disc the four pollinia are attached while its under surface is viscid readily adhering to any object with which it comes into contact.

On alighting the wasp forces open the lip and attacks juices contained in the swelling at its base. In this position the thorax of the insect presses against the column against which it exerts leverage. As the insect backs its way out of the flower the lip petal presses upwards towards the column in the attempt to regain its normal position. This causes the head of the wasp to remain pressed against the column in such a position that it is certain to come into contact with the naked under surface of the disc. This immediately adheres and, the line of border cells rupturing with the upward pressure the disc and pollinia are removed by the insect on its further backward movement.

When the insect, having visited another flower, commences to withdraw, the pollinia are caught against the projecting rostellum and forced upon the stigmatic surface where they remain, while fresh pollinia are removed as shown above.

The scent appears to be powerfully attractive to the wasps which fly from great distances straight to the plant and penetrate the flowers.

***Adenoccos major* (Ridl.)**

The flowers remain open for several days. The sepals and petals which are green are fairly widely expanded. The lip petal which is yellow green at first becomes orange red after expansion for some time. It is very fleshy and is concave at its base forming a cup immediately below the column. Down the centre of this cup is a white linear papillose projection or keel which lies just below the rostellum and anther. This projection or keel serves as an attraction to insects in the shape of food and is gnawed by them on visiting the flower.

The side lobes of the lip are small pointed projections and serve to prevent access to the keel except from the front of the flower.

The column is very short and is arched slightly forwards over the hollowed portion of the lip.

The rostellum ends in two tooth-like points between which lies the disc and caudicle of the pollinia. These pollinia consist of 4 round pollen masses attached by elastic filaments to the caudicle. They lie within a large one celled anther which is provided with strong flaps which grip over them and the anther is consequently usually removed with the pollen masses.

Immediately below the rostellum is the stigma which is situated within a round sunken cavity just large enough to take one or at most two of the pollen masses.

Let us suppose then that an insect of suitable size visits the flower attracted by the store of food contained in the keel of the lip. As this keel is very narrow and situated immediately below the disc of the pollinia which points downwards and inwards it is certain that as the insect eats its way inwards its head or thorax will at some time come into contact with the viscid under surface of the disc of the pollinia which will at once adhere to it. When therefore the insect leaves the flower the pollinia and anther will be withdrawn, the pollinia being still concealed within the anther owing to the stiff flaps of the latter.

On removal of the pollinia and anther the caudicle springs up at slightly more than right angles with the surface of attachment. After about 2 minutes the disc commences to contract carrying the caudicle and pollinia forwards and downwards through an angle of just over 90° . This movement, which is completed some four or four and a half minutes after withdrawal, causes the pollinia to wedge open the flaps of the anther which can then be easily dislodged. Moreover since the stigma is situated below the rostellum, on the upper surface of which the pollinia had formerly rested, it will be readily seen that until the pollinia have completed their downward movement they will not be in a proper position for penetrating the stigmatic cavity of another flower.

The time taken by the disc to depress the pollinia is of great importance since it renders it unlikely that any flower is pollinated by the agency of pollinia of another flower from the same plant. These plants are usually seen to grow in large colonies covering the trunks and branches of their host tree. Moreover it is generally the case that few flowers are expanded together on any one plant. The interval, therefore, of four minutes is calculated to allow the insect abundant time to deal with the food supply of the flowers of any one plant and to have visited another before the pollinia are properly positioned for striking the stigma.

When the insect visits another flower with the pollinia in the correct position the latter strike against the stigmatic cavity and one or two pollinia penetrating it are left upon the surface their filaments being ruptured by the edge of the cavity.

The fact that the stigmatic cavity is too small to take all the pollinia is of importance from the point of view of economy in that it ensures that each set of pollinia are capable of pollinating two or more flowers.

The keel in the cavity of the lip petal, though quite open, never appears to be attacked by ants and it will almost invariably be found that when this keel has been removed the pollinia have been removed also.

How attractive the flower is to certain insects and with what precision the act of fertilization as above described is carried out is fully evident by the fact that under natural conditions fully 70 per cent of flowers set capsules.

In *A. virens* the method of pollination is similar. The flowers are smaller than *A. major* and are produced on short racems 3 or 4 together; they are green and scented of vanilla.

The papillose ridge at the base of the lip is only about half the size of that of *A. major*, while the action of the pollinia is completed in some 2—2½ minutes. The anther, though withdrawn with the pollinia, is instantly dislodged.

***Saccolabium undulatum* (Ridl.)**

The flower is widely expanded and is fertilized by small moths. The lip petal is adnate to the column with which, by means of its broad erect side lobes, it forms a kind of cup at whose base is a small tube leading to the spur which is more or less parallel to the ovary and whose base contains nectar. The midlobe is reduced to a small linear process which is rolled back upon itself and presents no landing place for insects. The bases of the side lobes narrow inwards to a groove which acts as a guide to the maxillae of the insect. Just within the spur, on its upper side, are two small cushions between which the insect's maxillae must pass to reach the nectar at the base.

The column is short and is provided with large round arms the inner faces of which form a groove leading downwards towards the lip petal. Within this groove lies the minute disc of the pollinia seated upon the tip of the rostellum and projecting below the lip of the anther, while immediately below this is the small stigmatic opening just large enough to take one of the two pollinia. The groove between the column arms is a further guide to the maxillae and, in common with the other two grooves above mentioned, causes the insect to take up the same relative position to each flower visited.

The moth alights upon the back of the upper sepal, the outside of which is arched outwards. Guided as shown above it now inserts its maxillae into the spur. The maxillae, in penetrating, pass over the smooth upper edge of the disc of the pollinia. On withdrawal, however, the upward pressure raises the disc causing its viscid under surface to come into contact with the maxillae to which it adheres. This upward pressure immediately ruptures the line of delicate cells connecting the disc and caudicle with the remainder of the rostellum, and disc, caudicle and pollinia are removed adhering to the maxillae of the insect.

The caudicle is shaped like an oar the blade of which rests along the maxillae. The pollinia are attached to a projection on the blade of the caudicle and therefore stand well away from it.

As the insect withdraws its maxillae from another flower, therefore, the pollinia, in travelling up the groove between the arms of the column, are caught against the tip of the rostellum and one of the two pollinia is forced through the opening of the stigma and, its filament being ruptured against the side, is left upon it.

As the maxillae are further withdrawn the pollinia of the second flower are removed as shown above.

This plant affords a pretty illustration of economy in the expenditure of pollen brought about by the opening of the stigma cavity being so reduced as to be able to take only one pollinium. Thus each set of pollinia can fertilize two flowers. The usual percentage of capsules to flowers approximates 40%.

The flower is variable in the extent of the red markings on sepals and petals.

***Aerides odoratum* (Lour).**

The flowers are pollinated through the agency of large bees such as wood borers of the genus *Xylocopa* etc.

As regards first the structure of the flower where it affects pollination the column and base of the anther are completely closed up by the lip and only moderately strong insects can force entrance to the interior. The sepals and petals are widely expanded with the result that the lip forms a natural landing place in the centre of the flower which during the heat of the day emits a strong sweet scent.

The lip is stiff and fleshy and is kept appressed to the column by the manner of its attachment to the foot of the latter and by the fact that its side lobes, which are long and incurved, spring over the sides of the column. They also spring over the midlobe and keep it in position. The midlobe is long and upturned and consequently presses against and rises above, the anther, which it serves to protect. In the case of var. *bicuspidatum* (here figured) the apex of the lip is narrower and ends in two sharp points, a variation which is of a slight advantage in that it simplifies access to the interior of the flower by permitting easier leverage.

At its base the lip is up-curved into a small horn-like spur with a two-toothed callus about half way down while just below this callus are two small swellings, one on each side of the spur, and these secrete the sweet fluid with which the latter becomes filled.

The lip therefore completely closes the entrance to the flower and the only possible ingress is through leverage exerted between the apex of the midlobe of the lip and the anther and rostellum.

The rostellum is prolonged into a beak which stands well out from the column and at right angles to it.

At the apex of the rostellum beak is situate the small disc of the pollinia. This disc, which is joined to the remainder of the rostellum by a layer of delicate and easily ruptured cells is highly viscid on its under surface. To it is attached the caudicle of the pollinia which lies along the summit of the rostellum beak to which it is likewise attached by a bordering line of easily ruptured cells.

The cells which attach the disc and caudicle to the rest of the rostellum rupture instantly on a slight upward pressure.

On visiting a flower the bee alights on the lip and, inserting its maxillae between the anther and the apex of the lip, forces the latter open and enters the flower sufficiently far to reach the fluid in the spur.

As it withdraws, the base of its head comes into contact with the viscid under surface of the disc which adheres to it. The upward pressure causes the layer of cells bordering the disc and caudicle to rupture permitting the disc, caudicle and pollinia to be removed from the rostellum adhering to the head of the bee. The rostellum projecting into the centre of the space between lip and column causes the insect to move slightly to one side and ensures that after visits to successive flowers the discs will not be positioned all at the same point but rather spaced across the whole base of the bee's head. Thus one bee (*Xylocopa aestuans*) examined was found to have no fewer than six discs attached to the base of the head and only in one case had a disc been attached on top of another. Only two pollinia remained attached to caudicles, one on each of two separate discs. On removal of the pollinia the caudicle springs up and assumes an angle of about fortyfive degrees with the disc. This latter now commences to contract and continues to do so for some one and a half to two minutes. By this contraction the caudicle is first carried downwards till it rests on the head of the insect and is then bent slightly back upon itself so as to cause the pollinia to point upwards instead of downwards as on removal.

The cells of the anther are closed by stiff flaps which enclose the pollinia and consequently the anther is usually withdrawn with the pollinia. The contraction of the disc, however, pulls the pollinia downwards and they wedge open the flaps until after just about a minute the anther falls off or can be dislodged by a slight jerk. The loosening of the anther is also assisted by the bending of the caudicle during contraction of the disc, thus causing a certain amount of leverage.

The comparatively long time taken for the dislodging of the anther and the completion of the contraction of the disc with its consequent positioning of the pollinia for pollination is a precaution against the fertilization of flowers of any one plant by pollen from other flowers of the same plant since by the time

the pollinia have assumed their proper position the bee will have left the raceme from which they were extracted and will have visited another plant.

When, after the pollinia have completed their movement, the bee having visited another flower, withdraws its head, usually one of the pair of pollen masses will come into contact with the viscid surface of the stigma. But as the pollinia are attached to the caudicle by highly elastic filaments capable of being stretched to about onethird of an inch some mechanism is necessary for the rupturing of these filaments to ensure pollination. This is brought about by the rostellum whose sides bear on the stretched filaments and break them, leaving the pollinia upon the stigmatic surface. The strength of these minute filaments may be gauged from the fact that one of these large bees which had just left a flower was seen to be held hovering over it for some seconds until the filament of the pollinium, which was drawn out to onethird of an inch, ruptured against the side of the rostellum.

It will be readily understood that in the case of orchid flowers possessing only one pair of pollinia it would be of real advantage to the species if there was some arrangement whereby only one pollen mass could be utilized for the pollination of each flower. Some attempt at such mechanism appears to be made by this species for owing, as we have seen, to the central position occupied by the rostellum, pollinia become attached to the sides of the bee's head so that on withdrawal it is usually the case that only one of the pollen masses comes into contact with the stigma.

Owing to the fact that the spur contains an abundance of sweet fluid for the attraction of bees it is obvious that the flower must be provided with defence against ants which would also be attracted by the nectar yet would be useless for pollination purposes. This danger is overcome by the secretion of a sweet sticky substance on the stems and the outside of the sepals and petals even in the young buds. Small ants are attracted in numbers and these construct protective work of earth, particles of bark etc. which cover the flower stems and often the entire racemes leaving only the flowers to view. These small ants are quite content to remain on the stem and the outside of the sepals and petals and further serve to protect the flowers from the attacks of other creeping insects which might desire to rob them.

***Gastrodia malayana* (Ridl.)**

The plant, which is a leafless saprophyte, is very difficult to see, as its dark purple-brown coloured stem and dull coloured flowers match well with its surroundings in the shady spots in which it grows.

The number of flowers on a stem varies from one to twenty or more though generally they are expanded singly and usually last for one morning. Occasionally however they may remain open for two or even three days.

The flowers, by a twisting of the ovary, open facing one side in such a position that one of the lateral sepals forms the landing place for the insect. They are pollinated by flies and are coloured on the outside, as seen from above, dark yellow green and red, colours which are most attractive to these insects. Inside, as seen from the direction in which the flower faces, the general colour is yellow.

The sepals and petals are all joined together just below their tips with the exception of the lip petal which is free. This latter is attached to the somewhat long column foot. From its point of attachment it approaches the column till the bases of the sides of the midlobe press tightly against the rostellum and anther though, as the midlobe is slightly convex a space is left between its centre and the anther. The blunt side lobes embrace the column immediately below the anther to prevent an insect from leaving the flower except by means of the space between the centre of the midlobe and the anther. Owing to the length of the column foot, however, a space is left between column and lip over the lower half of the latter. The sides of the blade of the lip are involute and these sides together with the whole of the upper half of the lip are covered with a yellow floury substance which is devoured by the insects. This substance is particularly abundant on the involute sides near the base of the lip on each side of the space between lip and column and it is here that the insect makes its entry.

The stigma is interesting in that, unlike most orchids, it is situated at the base of the column near the column foot and immediately opposite the openings on each side of the base of the lip.

This is the more surprising when it is seen that the rostellum, which is of course a modified stigma, occupies its normal position at the summit of the column and immediately below the anther. It is well developed in spite of the fact that the distant position of the stigma renders unnecessary its chief function, namely that of preventing contact of the pollinia with the stigma which would result in the self-pollination of the flower.

When therefore an insect, having gained access through one of the openings, works its way up the lip in the hollow immediately below the anther its head must come into contact with the viscus to which are attached the pollinia consisting of two granular masses of pollen grains held together by viscid threads. The viscus immediately adheres to the head of the insect and is withdrawn by it, with the pollen masses attached, as the insect forces its way out at the apex of the lip.

The insect flies away in search of another flower and as it enters this the pollinia cannot fail to come into contact with the stigma placed as it is immediately within the openings between the base of the lip and the column. Some of the pollen grains adhere to the surface of the stigma and fertilization ensues.

The stigma in this species is not very viscid which from the loosely bound nature of the pollen masses would be unnecessary and even of possible detriment to the plant by causing unnecessary quantities of pollen to be retained by each flower subsequently visited. The stigma is just sufficiently viscid to break off enough pollen from each mass to ensure complete pollination.

Owing to the facts that the flowers usually open singly, that they only last usually one morning and that even in a comparatively large colony few flowers may be expanded together at any one time it frequently happens that insects re-visit flowers from which they have removed pollinia and in this way flowers are often fertilized by their own pollen.

As is the case with many terrestrial shade-loving orchids the shade cover beneath which this plant grows reduces to a minimum the action of wind in the dispersion of seed. These therefore fall usually close beside the parent plant and this results in the formation of very small but thickly populated colonies.

Observations taken in January, 1927 over two such areas may be of interest in showing the rates of capsules to flowers. The first colony was growing on the edge of an area of jungle while the second was some two hundred yards away in a field of rubber trees some twelve years old.

	Plants	Flowers	Capsules.
Area 1.	8	62	27
Area 2.	7	55	0
Total	15	117	27

Plate V.

1. Side view in section. Showing the small cushion at the base of the column above which the column is curved inwards to assist in leverage of the lip.
2. Column.
3. Pollinia.
4. Base of column.
5. Ditto larger and side view in section.

Plate VI.

1. Side view in section.
2. Top of column showing the lobes of the rostellum hanging down over the stigma, with the patch of paste just below the anther.
3. Base of column showing the orange swelling situated near the base of the rib on the column.
4. Small bee with pollinia in position on thorax.

Plate VII.

1. From young bud. Pollinia and stigma unripe. a. Anther; p. Pollinia; rp. Area of rostellum containing the paste-like substance required for removal of Pollinia.; s. Stigma.; sw. Wall of stigmatic chamber.; ca. Column arms.
2. From nearly mature bud, showing lateral pollinia not yet in contact with stigma. It will be noted that the lateral anthers are situated on each side of the stigma and below the rostellum.
3. Side view of same stage with one lateral anther removed to show mode of attachment. Stigma just ripening and lateral pollinia not yet in contact with it.
4. From bud prior to opening. The stigma is mature and the tips of the lateral pollinia are in contact with it. They are commencing to be drawn out across the surface of the stigma. Top anther closing down upon the rostellum.
5. Side view of same stage.
6. From flower just open. Upper anther completely closed down upon the rostellum. The lateral pollinia have been further drawn across the surface of the stigma with which they are becoming merged.
7. Later stage showing the lateral pollinia occupying the whole surface of the stigma. They have become greatly swollen, soft and nearly colourless being now quite merged with the stigma and inseparable from it.
8. Side view of same stage.

Plate VIII.

1. Face view.
2. Side view in section, with sepals and petals removed. The chamber between column and lip is clearly shown.
3. Column.

4. Section of column with near arm removed. fa. Filament of anther; a. Anther; c. Column; ca. Column arm; rp. Paste-containing area of rostellum; s. Stigma.
5. Oval starch cells. A single layer showing the loose arrangement.

Plate IX.

1. Side view in section with near column arm removed. Note the lobes of the rostellum over-arching the stigma cavity.
2. Column showing the anther nearly concealing the area of paste on the rostellum.
3. Attachment of Pollinia.
4. Top of the column with anther removed. fa. Filament of anther; rp. Paste area of rostellum; r. Rostellum; rl. Lobes of rostellum overhanging the stigma cavity; s. Stigma; ca. Column arms.
5. Column and apex of lip petal (looking into the flower.) c. Column; ca. Column arms; fa. Filament of anther; a. Anther; l. Apex of lip petal; fl. Floor of lip; e. Entrance to flower. It will be noticed how closely the lip petal fits about the column the only entrance being the small space 'e.'
6. Same as preceding with anther removed and filament cut off. One pair of pollinia remain in place. fa. Filament of Anther; cl. Clinandrum on which are seated the pollinia; p. pollinia; rp. Area of rostellum containing paste.

Plate X.

1. Full face view of flower.
2. Side view with lip petal in normal position.
3. Side, lip petal in second position (caused by penetration of insect.) Petals removed and lip in section to show side of hollow at its base.
4. Column. Note lip of anther is raised fully exposing the pollinia. This happens before the flower opens.
5. A petal.
6. Base of lip (under surface) to show chamber and hinge of attachment to column foot.
7. Base of lip (upper surface) to show the hollow at the base of which is the groove leading to the chamber by the hinge.
8. Small fly with pollinia attached.

Plate XI.

1. Flower (full face).
2. Side view in section. Note projecting stigma and chamber between base of lip and column.
3. Column from above. Note beak of rostellum projecting over stigma with one very small disc attached on each side. The pollinia may be partly seen in place beneath the curiously lobed anther.
4. Column full face.
5. Lip petal. Note the chamber formed by the side lobes and the base of the lip.
6. Head of bee with one set of pollinia attached to the base of one of the antennae and another set on the head close by.

Plate XII.

1. Flower full face view.
2. Side view of lip and column (lip in section).
3. Column.
4. Pollinia from above.
5. Pollinia from the side showing direct attachment to the disc.

Plate XIII.

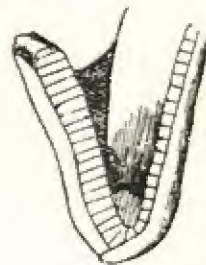
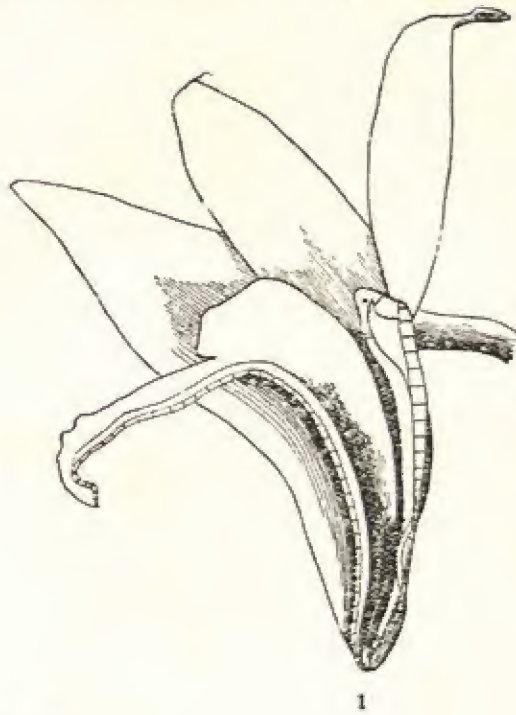
1. Flower, full face view.
2. Side face in section.
3. Top of column.
4. Anther (under surface) showing flaps.
5. Rostellum and pollinia (anther removed) showing attachment of disc and caudicle.
6. Pollinia on removal.
7. Pollinia after completion of movement of depression.

Plate XIV.

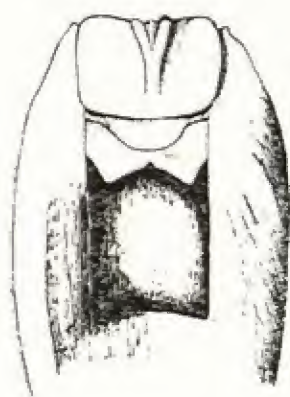
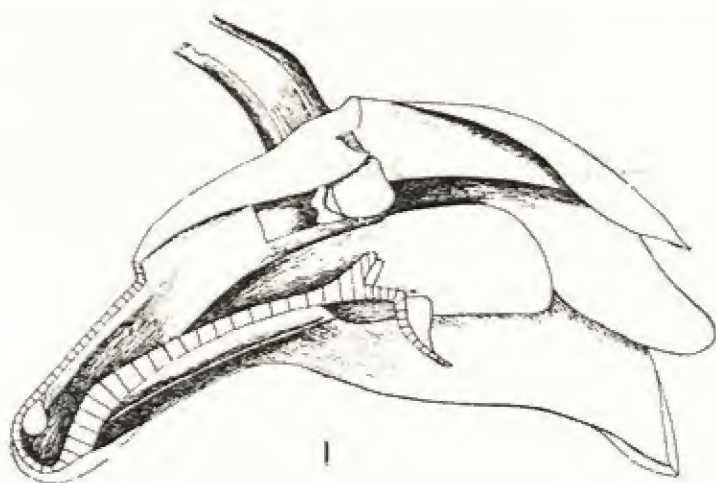
1. Flower full face view showing tube between column arms in which is situate the disc of the pollinia.
2. Side view in section.
3. Pollinia (from above).
4. Pollinia side view.

Plate XV.

1. Flower full face.



Dendrobium crumenatum (Swartz)



2



3



4

Dendrobium truncatum (Lindl)



1



2



3



4



5



6

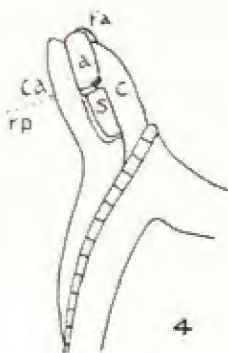
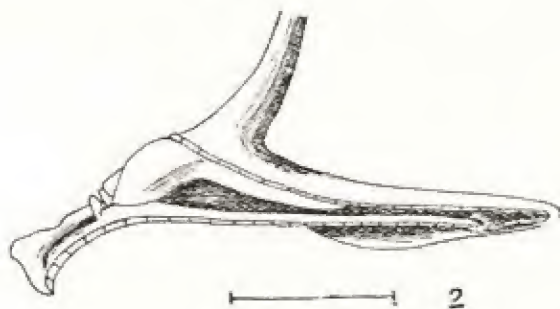
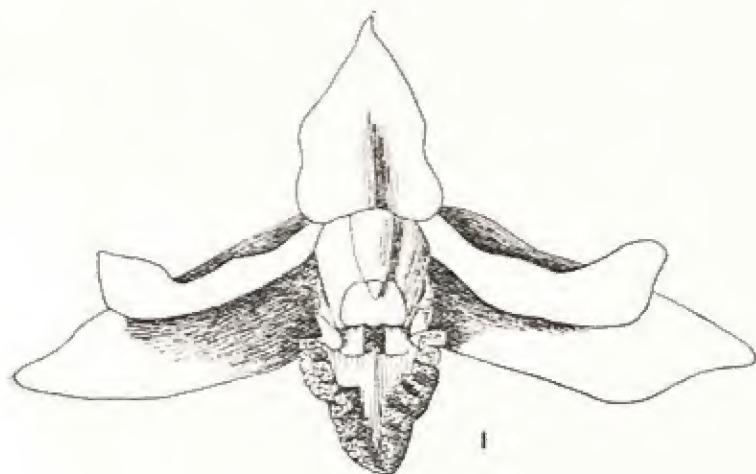


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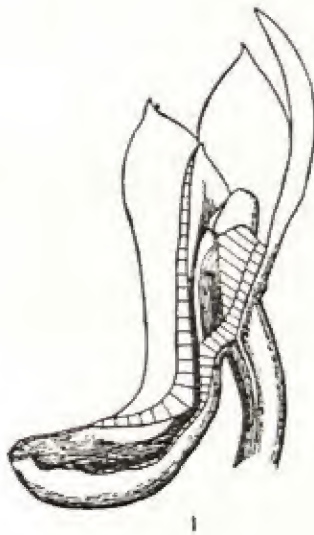


8

Dendrobium pandaenti (Ridl)



Dendrobium metachilinum (Rehb.)



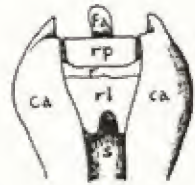
1



2



3



4



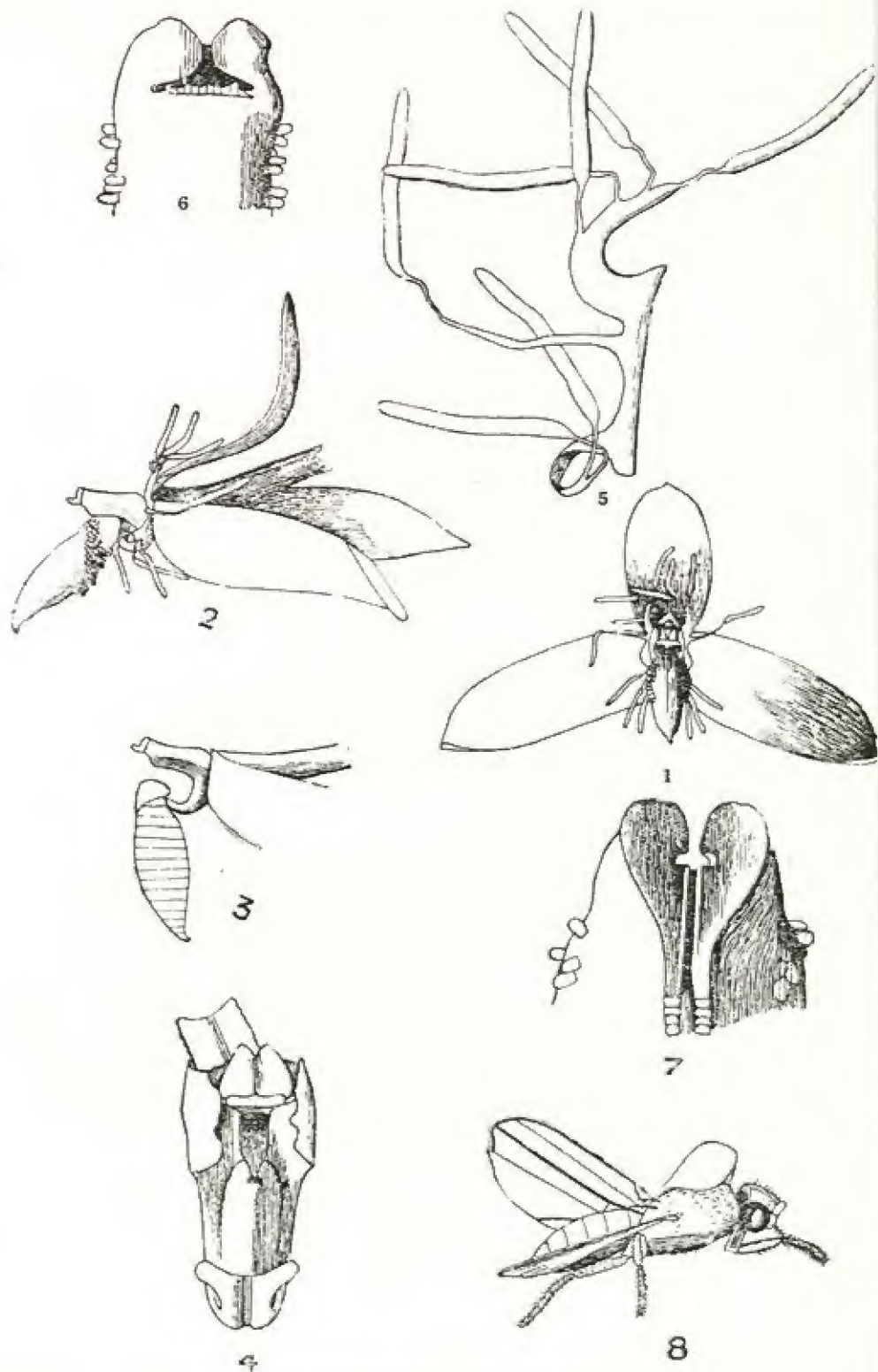
5



6

Dendrobium secundum (Lindl.).





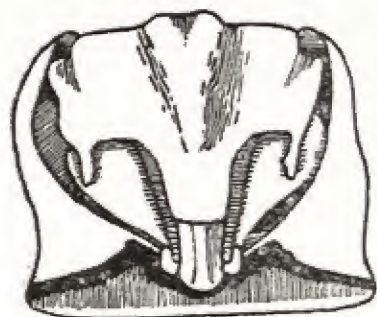
Bulbophyllum epicrianthes (Hook.).



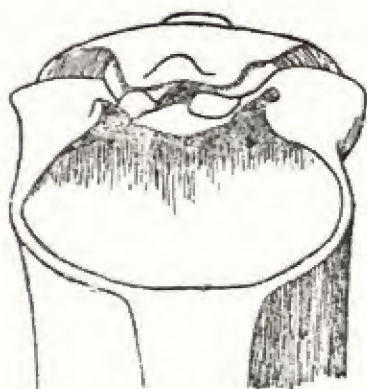
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2



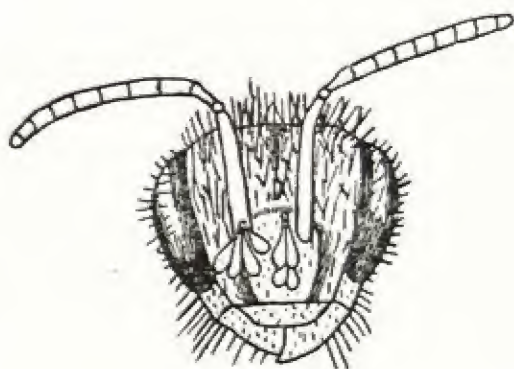
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4

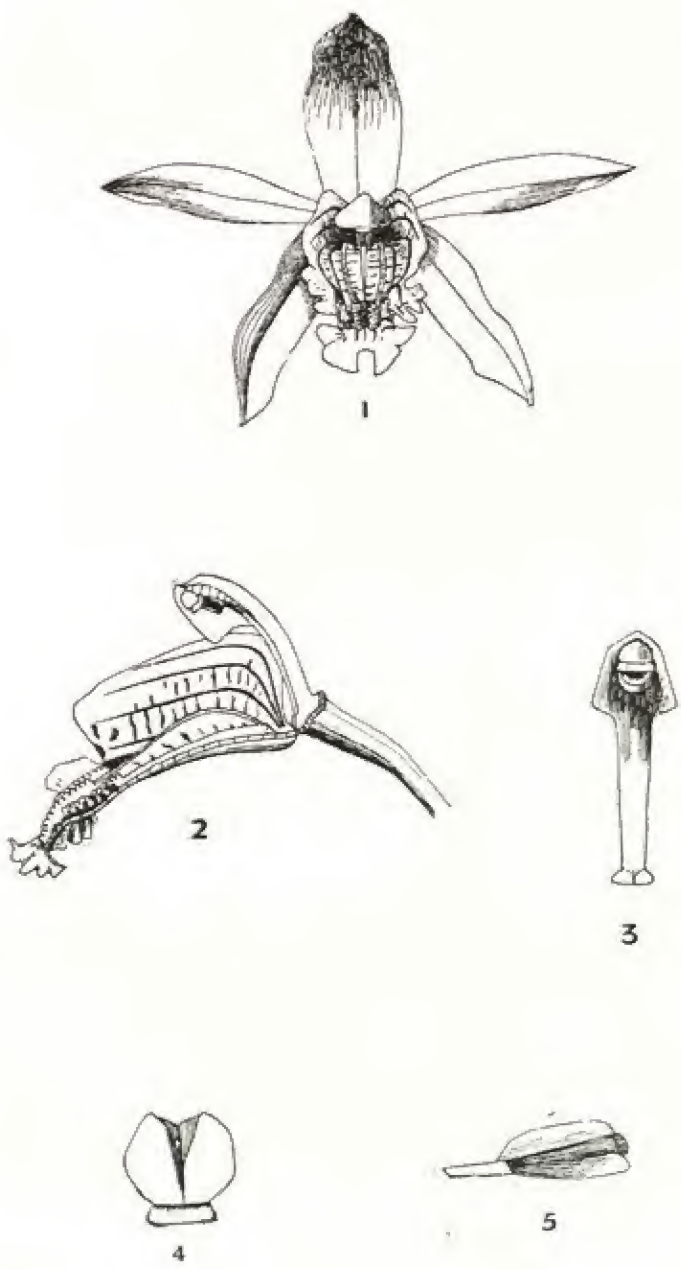


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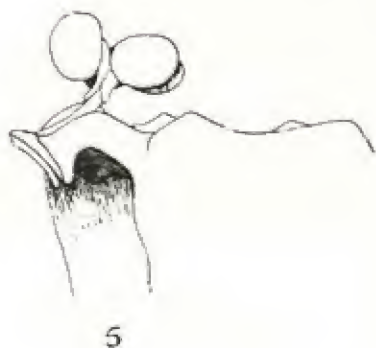
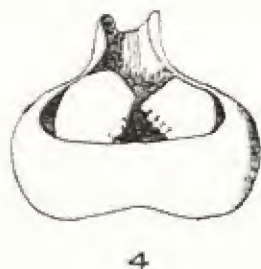
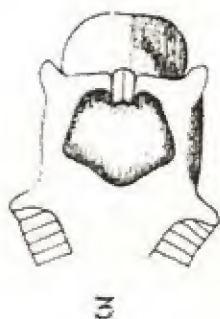
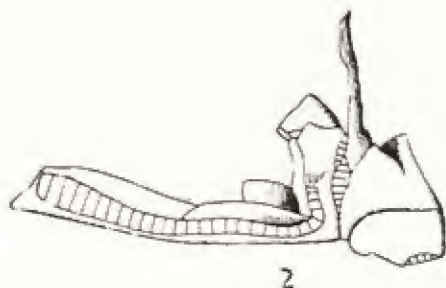
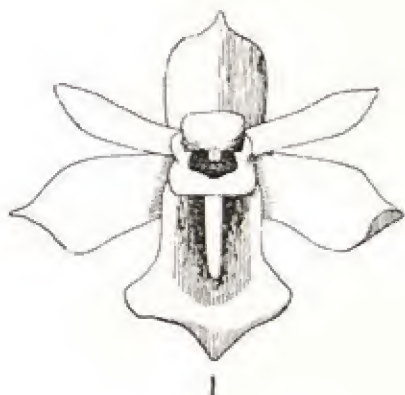


6

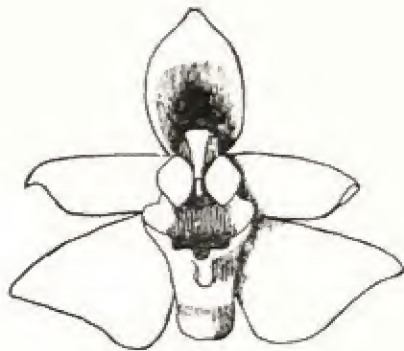
Eria floribunda (Lindl.).



Coelogyne Mayeriana (Rchb.)



Adenoncos major (Ridl.).



1



2

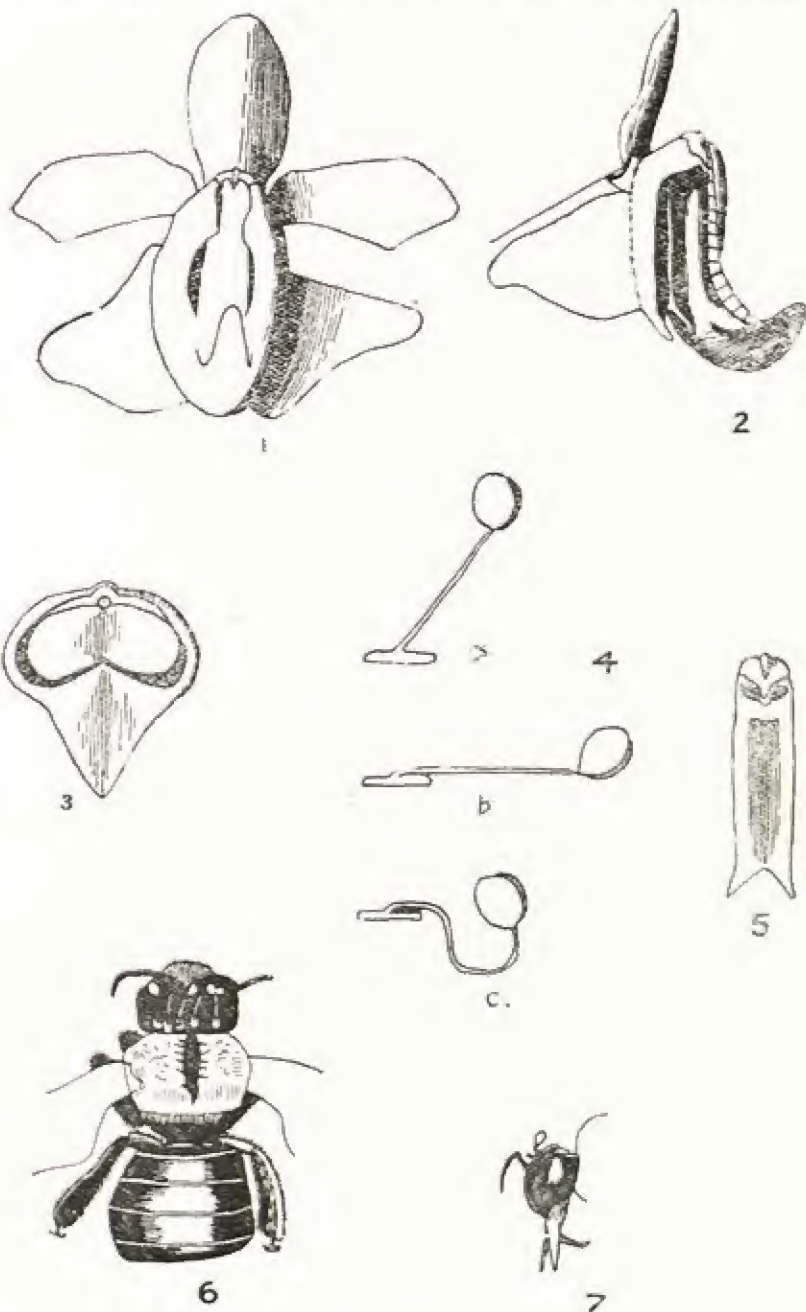


3

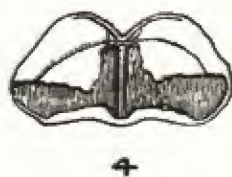
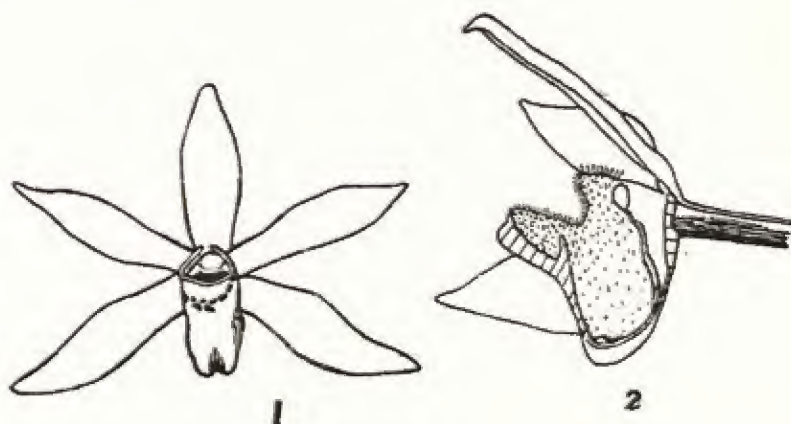


4

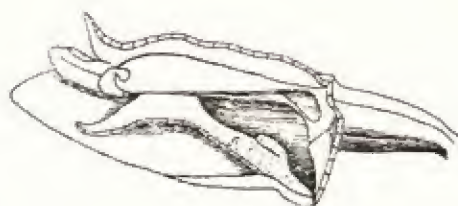
Saccolabium undulatum (Ridl.).



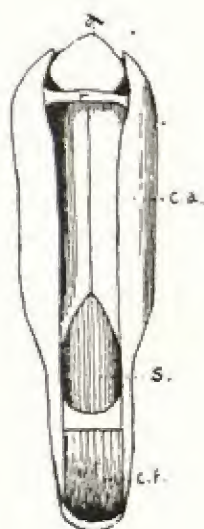
Aerides odoratum (Lour.).



Dendrocolla alba (Ridl.).



1



2

Gastrodia malayana (Ridl.).



2. Side view in section.
3. Anther (under surface) showing flaps.
4. Pollinia a. Position on extraction.
b. after partial depression.
c. on completion of movement of depression.
5. Column.
6. *Xylocopa aestuans* ♀ with discs and pollinia attached across the base of the head.
7. Do. Side view of head showing two discs attached one with pollinia.

Plate XVI.

1. Flower, full face view.
2. Side view in section.
3. Column.
4. Anther, under side.
5. Pollinia, showing attachment to disc.

Plate XVII.

1. Side view in section.
2. Column. a. Anther; r. Rostellum; c.a. Column arms;
s. Stigma; c.f. Column foot.

Kelantan Bull-Fighting.

by C. C. BROWN, M.C.S.

Kelantan still stands at that stage of civilisation at which combats between animals are the principal *jamuan mata* of the people. Football is growing in favour rapidly and a cup-tie will attract a big crowd on the Kota Baharu *padang*: but you will see an even bigger crowd at the Kota Baharu *bong* (bull-ring) when two famous bulls are engaged. Fish-fighting (*pēlaga ikan*) and cock-fighting (*pēlaga ayam*) are popular, particularly during the padi season when the bull-rings are closed, but unfortunately for their votaries these diversions are illegal. Ram-fighting (*pēlaga biri-biri*) is allowed and is much in favour, especially as a curtain-raiser to a big bull-fight, while buffalo-fighting (*pēlaga kērbau*) is an even bigger attraction than bull-fighting, though that may be merely because there are not many buffalo-fights and so few of any merit that everybody goes hoping at last to see a good one. But *the* sport of Kelantan is bull-fighting, which it should be noted means fighting between two bulls and not between bulls and men.

The Kelantanese admit that it is a borrowed sport, introduced from Siam where it is still extremely popular, though the number of bull-rings in Petani has been reduced: and it is to Siam that the wealthy Kelantan owner still goes for his fighting-bulls.

The Kelantan (or Siamese) fighting-bull is of the same stock as the Zebu or humped ox of India. He is a small, compactly built animal, standing less than four feet to the shoulder, with a large dewlap and a hump about nine inches high upon the withers. His smooth hair shows a fine sheen when he is in fighting condition. There is a considerable variety of colour. The following is a list of the colours I have actually seen, but it is not warranted to be exhaustive:—

Jēbat—The ordinary black, with perhaps the slightest show of a whitish colour under the belly, but there must be very little indeed. The name is taken from the *musang jēbat*. *Itam* is rarely heard among the cognoscenti of the bull-ring;

Kumbang—jet-black, i.e. the deepest possible black, with a fine sheen but no relieving colour whatsoever. The name is of course taken from the common borer-beetle;

Laka—black, but with a little brownish red under the shoulders and belly or under the tail. This colour is also known as *limau manis*;

Buah tal—the commonest of all the colours of fighting bulls, taking its name from the fruit of the Palmyra oil-palm. There are numerous varieties of this colour, but the prevailing characteristics are black on the hind-quarters and brown or grey on neck and shoulders;

Tapong (tampong)—black, similar to the *kumbang* described above, but with large splashes of white;

Arau—the *kumbang* black but with small white spots;

Kělěmbak—a dirty grey colour, taking its name from the bark of the *kělěmbak* tree;

Lasat (langsat)—the lightest of all the colours, even lighter sometimes than the colour of the fruit from which it takes its name: but the comparison is fairly apt;

Kijang—the reddish colour of the barking-deer;

Lipan tanah—the same as *kijang* but with black on neck and shoulders;

Kubing—the same colour as *kijang* but the tail is black;

Sěla—the darkest of all the reds, really a brown;

Kabul—used of a bull with a grey body and (generally, but not always) brownish shoulders: the name is taken from an animal I have never seen which is said to attack coconuts and is called *kabul* (the spelling is not guaranteed: it may be *kabur*¹).

There is considerable variety too in the shape of the horns. The favourite are those which are closely set (*pěkalan sěpit*²), long and upright (*panjang běrdiri*), as it stands to reason that a bull with horns of this type is likely to get inside the guard of a bull whose horns are wide apart (*pěkalan luas*) and curve outwards.

This matter of the shape of the horns leads to a consideration of the different styles of fighting, for bulls do not all employ the same methods and the conformation of the horns is of more importance in one style of fighting than in others. There are, broadly speaking, two classes of fighter. The first consists of bulls for whom the fight is a horning match pure and simple. This class has again to be subdivided into (a) bulls which use the upward stroke (b) bulls which use the downward and sideways stroke. Subdivision (a) is known as *pěnikam* "stabbers." In Malaya the stabbing stroke is usually upward, and *pěnikam* bulls get their heads down and jerk their horns up. This upward jerking is known as *rembas* and one hears *gěnap kali rembas, kěna* "he gets home every time he jerks up his horns." Wilkinson gives the word *rembas* and defines it as "an agricultural instrument something like a *běliong*." I have never seen this

¹ The pronunciation of *kabul* and *kabur* is the same in Kelantan.

² The Kelantan pronunciation of *pěngkalan sěmpit*. *Pěngkalan* is obviously *pangkalan*.

instrument but I imagine that the stroke with which one uses it is an upward one. Subdivision (b) is known as *pēnēbas*, for which there is no neat English equivalent that I know of. The point of the term is that the stroke is that of a man cutting (*tēbas*) undergrowth, i.e. downwards and sideways. One of the most famous bulls in Kelantan, the property of the Dato' Perdana Mentri, was an exponent of this particular method.

This bull (Sipai by name) is now past his prime and I have never seen him fight, nor have I seen any other *pēnēbas*, so I rely on hearsay for the description of this style of fighting. The business of bulls in this class, whether *pēnikam* or *pēnēbas*, is to try for a speedy "knock-out" in the shape of a flesh wound, with the horns, of a sufficiently formidable character to deprive the adversary of any further taste for the fight. When two *pēnikam* bulls are matched, it is a real fencing match and usually does not last long. The wound has to be more than a graze. One may see the fight won by a bull who showed blood sometime before his opponent, and also fights in which the vanquished bull received more than one fairly nasty wound before he gave in. In passing one may call attention to the fact that though Kelantan bull-fighting may not be *painless*, it certainly is not *brutal*: for the simple reason that the bull need not fight unless he wants to and can always break off when he has had enough. Brutality implies some element of compulsion and as the bull is always a free agent in the Kelantan ring, there is no brutality in the sport.

The second class of fighters consist of bulls for whom the battle is mainly a test of speed, strength and endurance. Their business is so to harry the adversary that the latter either abandons the fight from sheer exhaustion or weakens so far as to give an opening for a *coup de grâce* with the horns. There are various means to this end and in this class you have three quite distinct types of fighter, known as (a) *pandai* (b) *bērani* (c) *pēmulas*. The terminology reflects little credit on the pundits of the bull-ring, who should have been able to evolve something more descriptive than the vague *pandai* and *bērani*, terms which might be applied to any exponent of any method of fighting. The *pandai* bull is a hustler. He sets the pace and attacks with great speed and vigour, hoping to get his adversary on the run and drive him up against the fence of the ring. If he succeeds the adversary will probably throw up the fight there and then, for whether it is because the fence is hard or merely that it is unfamiliar, it is a real bogey to a bull and even the poorest animal will probably put up some sort of fight when he feels that the fence is near. The *bērani* bull on the other hand is of the slow but sure type; rather a dull fellow to watch, perhaps, as his business is merely to hang on and parry attacks until the opponent's wind gives out, but a formidable fighter for all that, who will always give you good value for your money. Last in

this class is the *pēmulas*, to my mind the most uninteresting fighter of the lot: his method resembles that of the old-fashioned school bully whose favourite form of "persuasion" was twisting the small boy's arm. The *pēmulas* interlocks his horns with his adversary's and then proceeds to twist (*pulas*) the latter's head round, while he at the same time pushes him back. This is a painful process for the victim, who will have to get out of the lock if he wants to keep the fight going. But it is rather dull stuff and it is a good thing for bull-fighting that the *pēmulas* is not a very common type.

Fights are generally arranged between bulls of the same type, but *pandai* bulls often fight and win outside their own class.

The question naturally arises, can one know beforehand what style of fighting a bull will adopt? If you can afford the price of an animal with a victory or two to his credit, you have seen for yourself how he fights and you know what you are buying. But supposing one can't run to anything but an untried bull, how are you to know whether he will turn out to be a deadly *pēnikam* or a tedious *pēmulas*? This is where the expert comes in, and I have been told how to spot a *pēnikam* or a *pandai*, though the distinguishing marks of a *bērani* or a *pēmulas* are still hidden from me. You examine the little whorl- (*pusaran*¹) of hair on the head behind the horns. If they lie close to the base of the horns, the bull is a born *pēnikam*, whereas if they are a bit further back, you may be sure you have got a *pandai*. To what extent the average buyer is prepared to back his faith in the expert in these matters I leave the reader to guess.

In any case the bull whether he be *pēnikam*, *pandai*, *bērani* or *pēmulas*, must conform to the general standard of "points" for all bulls. The hump must not be too high and should slope hindwards. The back must be long and straight, with no falling away towards the rump. The eyes "should resemble those of human beings" and the brows should be wrinkled. Eyes of the type known as *wakang*, i.e. showing a lot of white, are one of the signs of a *pēnakul*. The bones should be big (*kasar*) and the tail "like the string of a peg-top," while the wisp of hair at the tip of the tail should show a gentle taper. The horns should be thin (*pipeh*) and the coat smooth (*lumat-lēnyit*.) Above all the bull must be true to his colour; that is to say if he is *kijang*, then he must be of the true *kijang* red with no admixture of white or any other colour. *Jika kijang, bēri sa-jati kijang ia-itu satu bahasa ruma-nya, merah muda di-tuboh, di-lēngkok merah tua, tēntu-lah lēmbu itu bērani dan tanggung bong* (will win his fights).

1. Generally shortened down to *saran* in the colloquial language.

Our bull having satisfied the critics on "points" and being by all the rules a born *pēnikam*, we now come to the delicate matter of the price.

It all depends of course on what one is buying. The Chinese *taukeh* who decides to go in for bull-fighting may send a Malay emissary across the border into Siam to buy a bull who has proved himself in the rings of Petani. Such a bull may cost anything up to \$300 by the time he reaches Kota Baharu, and even if the buyer sticks to Kelantan he will have to pay a stiffish price for a bull who has won a fight or two. But for an untried animal one should not have to pay more than \$80.

Assume the bull to have been bought, straight from the kampong; the next thing is to get him into fighting condition. One will probably have to start by putting flesh on to him, though exactly how fat a fighting-bull should be I have not been able to discover. If he is too fat, of course, he will probably be short in the wind; but I gather he ought to be well covered, though it does not matter if his ribs are faintly visible. For a weight-adding tonic one's imagination conjures up some Malay nostrum, the secret of which has been jealously guarded by generations of bull-trainers: and one is accordingly somewhat surprised, even perhaps disappointed, to find that, in this year of grace at any rate, the favourite specific is Guinness' stout! We drench our bull daily with a bottle of stout for ten days or so, and there is soon a visible improvement in his appearance. His grass too must be of special quality and we may have to go a mile or two to fetch it. Meanwhile the bull has to be exercised daily and there must be some one with him all day if only to keep the flies off him.

As soon as the bull is beginning to look ready for the ring, we set about arranging a match. As our bull is a *pēnikam* he will probably be matched against another *pēnikam*, but we shall be cautious in our choice of opponent. Malays may be reckless in games of chance, but they take no risks when matching their bulls for a fight. When you have seen Awang Bēsar's Jēbat winning one fight and Awang Kēchik's Lasat (Langsat) winning another, and in your ignorance you suggest that they would be a good match for each other, some wiseacre will shake his head and reply *balek Lasat tak sir gamak-nya* (I doubt if "Langsat" would take it on.) If ever you see bulls of unequal size in the ring, you may be sure that the smaller animal is believed by his owner to possess some superiority in fighting skill to counteract the difference in weight or he would not be entered. Bull-fighting is not regarded as a gamble, by the owners of the bulls.

Then too there is the question of the stakes (*tarohan dalam*). When ring-side betting (*tarohan luar*) was not the business it is now, the stakes were much bigger than they are in these days, and one hears of fights in the past for as much as \$1000 a side.

But nowadays the rival owners will have side bets on the fight, and \$250 as a stake is big money. Ours being a match between two untried bulls, the stake will certainly not be more than \$100 a side and may be as little as \$25.

Assume then that we have found a satisfactory match, that the stakes are \$100 a side and that the date is fixed for a fortnight hence. We are now entered on the last stage of the training. Our bull is led to the ring, whenever there are fights on, and tethered there, with a view to getting him accustomed to the "roar of the ring" and also to the proximity of other bulls. One will always see at least a dozen bulls tethered near the ring on a fighting day, none of which are actually engaged that day. The bull must be closely guarded day and night, for although bull-fighting in Kelantan is becoming a far more gentlemanly affair than it used to be, the practice of doping the other man's bull is not obsolete.

It is time too that we consulted the sooth sayer (*nujum*) at this juncture, or we may find that we have lost the fight because our bull took up an inappropriate station at the outset of the fight. I have seen one of the charts used by the soothsayers for this purpose, but unfortunately I left Kelantan before I had time thoroughly to inquire into its use. The chart is drawn in the form of a compass, and we can find from it what station our bull should take up according to the day of the fight and how he should reach that station. Thus if for instance the fight is on a Saturday, the bull should face north and should then take so many steps eastward, until he is facing north-east, the correct station (*dudok ka-ulu adap serong ka-mata-bari naik, baharu bêtul*): and so on. What happens when the soothsayers ordain that both bulls should take up the same station, I have yet to find out: but in consulting the soothsayer, we can at any rate congratulate ourselves on being in good company, for no Kelantan gang-robber would think of embarking on a venture without ascertaining from the soothsayer's chart the proper direction for the first steps to be taken at the outset of the enterprise. I wish I could have gone into this question of the *nujum* much further, as he undoubtedly plays a considerable part in the preliminaries of a bull-fight, e.g. it is on his prognostications that the book-makers base their opening prices.

The day of the fight at length arrives. It will probably take place about 4 p.m., and as the standard of punctuality is rather higher in bull-fighting than in most of the concerns of Malay life, it behoves us to have our bull there in good time, particularly as certain last attentions have still to be paid to him. Formerly one used to smear the bull's horns with stuff which had the effect of considerably adding to the pain of any wound they might inflict. Of these *pēmōdeb*, as they were styled, there was considerable variety, and one hears of men as famous for the

pungency of their particular *pēmēdeb*. But that sort of thing is very properly prohibited nowadays, and we are only permitted to use certain preparations which produce no detectable physical effect, however great may be their magical properties. To prevent the adversary's horns inflicting a wound, we smear our bull's head and neck with a *pakan* made from pounded leaves of *kēkabu* and *mēdang pulut*, and to ensure that our bull's horns will penetrate, we smear them with a *pēruang* made from human milk mixed with the milk of a tigress! As to the actual results of the *pēruang* let the reader judge for himself: but it is possible that the *pakan* has some practical efficacy, as the greasy surface it produces may cause the adversary's horns to slip instead of penetrate. Malays have considerable faith in these *pakan* and *pēruang* and you will hear *ah, lawan-lah, ada pandai pēruang, ada pandai pakan*.

Our next concern is with the book-makers (*tok jora*¹) who are usually to be recognised by their favourite dress, viz. *sarong*, headkerchief, white singlet, with black cloth round the waist. Betting in the Kelantan bull-ring is a remarkably casual affair. The book-maker occupies no regular pitch and if we bet with him, he neither gives us a ticket nor records the bet. It is accordingly not surprising that there is some welshing, and one must exercise discretion in placing one's bet, or to use a local phrase *kēna chari orang ada muka* (one must look for a man who has some sense of shame). It is worth quoting the following local commentary on the ways of book-makers:—*aku bērtaroh habis 'dah, ganda empat tiga, 'kek-nya (tētapi) aku bimbang juga, takut nya buat lari. Aku tengok mata tērkerling-kērlat sa-rupa rusa masok kampung, ikut orang bēri, ambil tadah kendong, tidak bēchara bak siapa-siapa dia, nya lawan bēlaka* (I have put it all on at 4 to 3, but I would not be surprised if the fellow did a bolt with it. He was looking out of the corners of his eyes like a deer that has strayed into a village. He was just taking the money as it came, letting it pour into the fold of his sarong, not worrying whose it was but just taking every bet that came). The *orang darat* (country people) are frequently victimised. Some engaging scoundrel borrows a smart suit of silks and a couple of \$5 notes. He struts round the ring, making much play with the two notes, and by offering slightly better prices than the more reputable members of the fraternity he has no difficulty in collecting a fair number of bets. As soon as the fight begins, he mingles with the crowd and the successful backers will search for him in vain if the fight goes against him.

At this juncture one may note some of the betting phraseology. To bet is *main*. The odds are *ganda*, which at the outset are generally quoted with *sa-puloh* marking the price of the favourite. Thus one hears *ganda bērapa?* What is the price? *Sapuloh*

1. The Kelantan version of *juara*, just as *sora* is Kelantanese for *suara*.

enam, 10 to 6; that is to say, if one is backing the favourite, one puts on \$10 to win \$6. Later the price may be quoted in smaller figures, e.g. *empat tiga*, *dua sa (satu)* etc., etc. The favourite is known as *lumbu ganda* and the outsider as *lumbu makan ganda*. If one wants to know which is the favourite, one asks *balek mana ganda?* To back the favourite is *bəri ganda*: to back the outsider is *ambek (ambil) ganda*. If the favourite is beaten and the outsider started at a good price, one hears *makan molek*, which means a good win for the people on the outsider.

The "ring" (*bom* or *bong*: either pronunciation is equally common) is actually a square or an oblong. The Kota Baharu enclosure is about 60 yards square. There is a high outer palisade to shut out the view of those who are not prepared to pay for admission, while the ring itself is enclosed by a low fence round which the spectators stand. The two principal bull-rings in Kelantan are† in Kota Baharu and at Kubang Krian, the property of the Raja Muda, about 4 miles out of Kota Baharu. Admission (*pitis bong*) is generally 10 cents, but may be raised to 20 cents for a special fight. Buffalo fights are occasionally held at Kubang Krian, but seldom in Kota Baharu. On the occasion of festivities, such as those in celebration of His Highness the Sultan's birthday, temporary rings may be opened in other places and I have seen bull-fights at Tumpat, Pasir Puteh, Pasir Mas and Kuala Krai in honour of His Highness' visit.

All is now ready for the fight and the two bulls are waiting in their respective corners. Ours, we are glad to see, is horning (*mërembas*) the earth, while the other side's bull is lying down and we hope this is as a bad a sign as it is thought to be, indicating no great desire for battle. In the middle of the ring is a mark, consisting of a twig planted in the ground, to which the two bulls have now to be led. Each bull is held by a cord passed through his nose-ring and there is a slipping device by which the bulls can be loosed at the moment when both noses are over the mark. I have assumed that in the fight to be described both bulls are of the *pënikam* type. As soon as they are loosed, down go both heads, each bull striving to get inside the other's guard with the upward jerk (*rembas*). As pointed out above, the formation of the horns is a matter of great importance when it is a match between two *pënikam*. The bull whose horns are closely set (*pëngkalan sëm pit*) starts with a great initial advantage against an adversary with horns wide apart (*pëngkalan luas*), and if one had no "form" to guide the placing of one's bet, it would be fairly safe to back the bull with the closer-set horns.

Crash follows crash until a shout proclaims that the other bull shows a wound. Our bull has got inside the other's guard, but it is only a graze (*luka tidak dalam, tetas kulit 'jab*) and the

†Or were, when the writer was in Kelantan. Now I believe Lubok Nilam, the country seat of H. H. the Sultan, is the Newmarket of Kelantan.

adversary makes light of it. At it again, and soon it is the other side's turn to acclaim a hit. This is no mere graze and our bull shows that he does not like it, by beginning to falter and back away. It is a critical moment, but our trainer saves us. When the bulls were loosed, the trainers squatted down inside the ring, about five yards away from the bulls. From this range (which they have constantly been attempting to shorten, only to be hauled back by the ringmaster) they have been exhorting (*alak*) their charges by signs and word of mouth. Now when our bull looks like leaving the field, our trainer signals to him and as he has put himself on excellent terms with his charge, the *alak* has effect. To quote the local phraseology, *kalau nampak alak, tirkam masok sĕmulai* (if the bull sees his trainer urging him on, he returns to the attack). And so it is today. We have the exhilaration of seeing our bull "staging a come-back" with a vengeance, and it is not long before he really gets home with his horns, inflicting a nasty wound at the base of the adversary's ear. Again to quote the language of the ring *Hab, kena 'dab-la.... tĕkolir 'dah tĕlinga....ah, sudab bundor 'dah....ah, lari 'dab!* (He's got one....his ear's droopinghe's backed out....he's run!)

The other bull has beat a retreat and left ours in possession of the field, but the fight is not over yet. Our bull has to take up his stand at the mark in the middle of the ring, whither the other bull has to be led up to him. But the other bull has to be caught first. Since he disengaged, he has been running round the ring, expressing his feelings with an occasional bellow of rage. His trainers now give chase, the one carrying a light pole on the end of which is a wire hook, and the other a cord. With the cord the bull is loosely lassoed, which slows down his paces and enables the other man to catch the nose-ring with the hook on his pole. Occasionally a bull knows-his-master-so-well (for which the one word in Malay is *rat*) that he will come in when called, and the cord and hook are not necessary. Thus again to quote the vernacular, *Jĕbat Pak Da rat tĕb dĕngan Pak Da, ikat bidong tidak payah. Pak Da panggil, dĕngar sora (suara) Pak Da, mari ngok-ngok sĕlalu* (Pa' Da's "Jĕbat" knows his master wonderfully. There's no need to catch him by the nose. Pa' Da calls him and when he hears the voice, he comes trotting straight up to him). The other bull is at length caught and led towards the mark. Will this be one of the occasions on which the victor of the first round declines battle in the second? I once saw a fight in which an outsider who had won a desperate first round was so overcome by the spectacle of his adversary preparing to give battle a second time that he broke away and ran. It was then his turn to be caught and led in. If he refused to engage in the third round, his victory in the first counted for nothing and the fight went to the favourite. Even the babble of Malay tongues was hushed as the trainer coaxed his charge up to the

mark. It was all he could do to get him there: but he succeeded, and mighty was the shout when the victor of the bloodless second round turned and ran after a very brief encounter. But we are spared these thrills today and the opponent having with difficulty been led to within a yard or two of our bull executes a retrograde movement of quite as determined a character as that of Mr. Winkle's horse, and the fight is ours.

Like most battles between *pēnikam* it has been a short affair, lasting little over five minutes. If the fight had been between two *pandai* bulls, it would probably not have lasted much longer, but get two of the *būrani* type engaged and the fight may go on for the best part of an hour. You will see some very thrilling battles and some exceedingly dull ones, but in Kelantan bull-fighting is never the cruel business it is in Spain, and one can very easily spend one's Monday evenings in less interesting places than the *bong* at Kota Bharu.



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Kedah Laws.

By R. O. WINSTEDT, C.M.G., D.LITT., OXON.

Some years ago, by the kindness of Mr. W. E. Pepys of the Malayan Civil Service, a copy of what purported to be the only extant manuscript of ancient Kelantan laws was obtained from Dato' Luar of that State.

The manuscript contained four different codes and a chapter dealing with the manufacture of the *bunga mas* (or tribute of golden flowers formerly paid to Siam), the installation of rulers and betrothal customs.

The oldest and most interesting of the four "codes", dated 1650 A.D., was discovered on examination to have been compiled, when Sultan Rijalu'd-din Muhammad Shah ruled at Naga (Section 34):—the Marhum Naga of a later code. A Sultan Muhiyyu'd-din Mansur also was mentioned (Section 35). A Sultan Jamiwa added more gold to the *bunga mas*. Sultan Ahmad Taju'd-din Halim Shah ibni Sultan Abdullah Mukarram Shah "ascended the throne in 1222 A.H." and himself did homage at Bangkok.

The names of those rulers have exploded the authenticity of these ancient Kelantan Laws. For they are the names of rulers of Kedah (J.R.A.S., S.B. 81, 1920, p. 34)!

The sections of the manuscript, (which I am giving to the School for Oriental Studies, Finsbury Circus, London), are as follows:—

- (1) Port Laws, dated 1650 A.D.
- (2) *Tembëra* Dato' Sri Paduka Tuan, dated 1078 A.H. = 1667 A.D.
- (3) *Hukum Qanun Dato' Star*, undated
- (4) A chapter on the *Bunga Mas* etc.
- (5) *Undang-Undang*, dated 1199 S.H. = 1784 A.D.

The copying of the last (maritime) section of this code purports in the colophon to have been concluded in 1222 A.H. under Sultan Jamal al-'Alam Badr al-munir, a prince of Arab descent who ruled Achéén from 1703 till 1726 A.D.: an Achinese copy of the same year belongs to the Batavian Society (van Ronkel's *Catalogus*, p. 307).

These laws of 1784 A.D. were compiled by the Dato' Bendahara in consultation with the Paduka Maharaja, the Dato' Kuraja Chenaka, the Paduka Raja, the Sri Raja Putra and Paduka Sri Maharaja Jalil. They commence with various rules of court etiquette, already set forth in the earlier laws; they then copy, except for verbal inaccuracies, Sections 1-23 of the *Undang-Undang Mēlaka* as edited by Dr. Ph van Ronkel (Leiden 1919); they have a few pages on marriage, divorce, adultery and commerce and they

conclude with the Malacca Maritime Code. A better version of these maritime laws, omitting reference to Sultan Jamal al-' Alam and purporting to be the laws laid down by Sultan Mahmud Shah of Malacca, is to be found in another (unpublished) manuscript version of Kedah Laws written down for the late Mr. E. A. G. Stuart and by him given to me. Except in this section on Maritime Law and the section on the ceremonies for receiving ambassadors' letters Mr. Stuart's version differs widely from the laws here printed. It omits the early port laws and is more literary in form.

In view of the fact that it consists almost entirely of the Malacca Code and the Malay Maritime Code, the fifth section of my manuscript is not printed here. An identical but better text of several sections of the maritime code will be found in de Hollander's *Handleiding* (Breda 1893), pp. 253-257, and the Code was translated by Dulaurier: *Institutions Maritimes de l'Archipel d'Asie* (Paris 1845). There are also manuscripts at Leiden.

Yet another edition of Kedah laws, copied for Raffles but not including the maritime laws, exists in the Library of the Batavian Society (Van Ronkel's *Catalogus*, p. 299).

I am indebted to Messrs. C.O. Blagden and B. Cartwright, both of the School of Oriental Studies, London, for the interpretation of Siamese words at the end of Chapter two.

OUTLINE OF THE PORT-LAWS OF 1650 A.D.

In 1060 A.H. (1650 A.D.), the year Zai, on Friday the 17th day of Jumada'l-akhir, His Highness the Shah of the World ordered Paduka Raja to record the laws enacted by Dato' Besar of old.

2. A stranger entering the country pays 6 *kupang* in gold for his permit. If he exports buffaloes, the tax is 6 *kupang* in gold a head; if elephants, a *paha* of gold; if slaves, 1 *emas* for each slave.

For the recovery of runaway slaves in the royal domain, the fee is a *paha* of gold; if outside that domain, $\frac{1}{2}$ a *tahil*.

Persons bringing letters to the Raja, Mantri or state officers are exempt from dues. But the crews, cattle, elephants, slaves and merchandise of all comers and goers must be scheduled.

Persons who run into the royal domain must be arrested and, if resistance is offered, can be killed without blame and their goods estreated.

3. These laws were enacted in the days of Raja Stia Bijaya, when Raja Jalil Putra was harbour-master (*Shahbandar*). The Dato' Besar consulted the Orang Kaya Maharaja Indra and Orang Kaya Sri Maharaja Khankhan and all the state officers. At that time Dato' Laksamana Che' Shahdin was warden of the port (*Panglima Bandar*).

4. The laws were designed by Shah ' Alam and the Yang dipertuan to determine the customs of the port and the duties of the harbour-master.

5. Vessels on arrival are to fire a gun, when the warden at the river-mouth (*Panglima kuala*) will report the place whence she has come, the name of her captain, the number of her crew, her tonnage and cargo to the harbour-master, who will report to the warden of the port, who will inform the Raja. The harbour-master and the Raja's police will go down to the ship and after exchange of presents (fixed by custom) will bring her up-river.

6. Paduka Sri Bongsu carries out these regulations and instructs the captain to go to the warden of the port. Captains of ships from Kalinga will present the warden of the port with a long *puadam* cloth of the value of one *paha* of gold; captains from Gujerat with a roll of cloth from Baruch. Bales of merchandise shall be listed and valued by a merchant of the port, and the customary presents made to the Raja: by ships from Kalinga 400 *mas Patani*, by ships from Gujerat 600 *mas*, the amount varying according to their size and cargo.

7. Captains shall pay the warden of the port $2\frac{1}{2}$ *tahil*, the warden of the state (*Panglima Negeri*) 2 *tahil*, and the warden of the river-mouth 10 *mas* on entry and 14 on exit.

8. The duty on bales is 2 *kupang* a bale paid to the warden of the port; for storage, one roll of *bafta* cloth for every 4 bales. Ships from Kalinga give the two harbour-masters and their men a roll of Serampore cloth for guarding the warehouse. Formerly all bales had to be stored but now this is unnecessary, though the prescribed fee is still charged. For counting every 1000 bales two rolls of cloth are taken, of *bafta* from Kalinga ships, of Serampore cloth from Gujerati ships.

9. For opening his bales, a captain must have permission from the warden of the port, paying further presents of cloth. An inventory of all cloths is taken and submitted to the Raja who can buy what he wants at a valuation.

10. A captain must inform the harbour-master before he can buy rattan, *damar*, gutta and mast poles.

11. To avoid disputes, sales on credit must be concluded before the harbour-master.

12. If a captain buys craftsmen (?) for export, the purchaser pays a tax of 1 *mas* a head and the seller a tax of 2 *kupang*.

13. A captain shall inform the warden of the port and the harbour-master of monies due to him in the port. They shall collect them, charging 1 *mas* for every *tahil*. Debts by the Raja or by chiefs shall be collected through the warden of the state.

14. Ten or fourteen days before sailing a captain shall inform the harbour-master. The Raja will make farewell gifts to him, order goods from the country whence the captain comes, and the Raja's reply to any despatches brought will be escorted to the ship.

15. The harbour-master will examine every ship about to sail. The overseer at the river-mouth shall get a fee of 1 *paha* of gold for

pilotage and, if elephants are among the cargo, a gangway fee of 1 *paha* a beast.

16. Ships bringing letters from "Captains" and the bales of the "Company" are exempt from formalities and charges, provided customary presents are made to chiefs and the Raja.

17. When ships from Kalinga reach the river-bar, the officer there shall make an inventory of cargo and crew and slaves and after receiving the customary present, e.g. of salt, give the captain a pass to the harbour-master, who shall get a present of 6 *kupang* and bring him to the warden of the port, who shall receive a present of 3 *mas* and report about him to the Raja.

18. If a ship's tonnage is 40 *koyan*, a third of the cargo for sale is taken at a reduction of 6 *mas* a *koyan* in the case of salt. Presents in fixed proportion are made to the Raja, the warden of the port, the harbour-master and their satellites. If a captain gives large presents, the Raja may make him quit of all obligations for his stay.

19. If a ship's tonnage is 20 *koyan*, 4 *kuncha* are taken for port dues, one of them for the warden of the port. The one *kuncha* is apportioned as follows:—the warden of the port 6 *naleh* 5 *gantang*, the harbour-master 3 *naleh* 2½ *gantang*, and their satellites 9 *gantang*.

20. If a ship's tonnage is 10 or 5 *koyan*, the dues go to the warden of the state; if less, to the warden of the port and the harbour-master. If a ship has not a cargo of salt, its cargo is valued according to the price of salt. If she brings slaves for sale, the warden of the river-bar levies a tax of 1 *mas* a head.

21. If a man bring foreign slaves for sale, the warden of the river-bar levies a tax of 2 *kupang*: when they are sold, the warden of the port charges a fee for witnessing the sale, of 4 *kupang* from the seller and 2 from the buyer.

22. From ships bringing tin from Perak or elsewhere the warden of the river-bar levies a fixed charge of 2 *bidor* and further charge for inspection of 1 *bidor* for every *bahara*, wherewith to buy munitions. A captain who fails to get a permit from the warden of the river-bar for the harbour-master is liable to imprisonment and to fine (?). The charge for inspection was doubled in the time of Sri Johan Pahlawan. If a ship has 6 *bahara* of tin, 2 *bahara* are bought compulsorily at a *kupang* of gold lower than the market rate. For tin is a very important article of merchandise here, wanted by ships from Gujerat and a number of ships from elsewhere.

23. Tin may not be used as currency. Persons are forbidden to buy betel and tobacco and articles for a *bidor*, a *tampang* or a *penjuru* or two of tin. Whosoever disobeys this rule shall be (?) . . . for three days in three different places in the market.

24. Captains bringing letters of embassy, or delegates from chiefs of another country to local chiefs are exempt from taxation.

25. When a foreign ship leaves, the harbour-master shall search and see that no prohibited goods are exported. The fee for a port clearance is 1 *kupang* for every two persons, except that a captain and one servant are exempt. From some vessels that have received a sealed letter from the warden of the port no fees are levied by the harbour-master, nor from captains who may be commissioned to buy goods for the Raja.

The harbour-master shall examine if a captain is taking away debt slaves or minors or accused persons or servants, and seize him if he is so doing.

26. The harbour-master and his police collect all merchants taking offerings to the Raja and bring them before the warden of the port. The customary offering to the warden of the port is one *paha*, to the harbour-master 2 *mas*, and to the Raja one or two *mas* or a *paha* according to the status of the merchant. The Raja returns a present of buffalo meat and beef.

27. The harbour-master and his police daily inspect the market to prevent gaming, cock-fighting, opium-smoking drinking spirits, unlawful sales and purchases and quarrels. In consultation with the marshal (*bĕntara*) of the warden of the settlement, the harbour-master and his police arrest all persons violating Muham-madan law, slay those who resist and seize unlawful property: persons arrested are sentenced by the Raja. No buffalo may be slaughtered except under the seal (*chap*) of the harbour-master to prove the identity of the beast and of its owner. Buffalo thieves shall have the head of the beast hung from their necks and be taken around by a crier with a gong, and cry out, "I am a buffalo-thief! Behold me!" In the Fasting Month, whoever breaks the fast in the market, shall be arrested and forced to eat grass in front of the *balai* or beaten in the middle of the market. Knives and daggers may be redeemed (*dĭ-tĕbus*) on payment of 1 *kupang*.

28. All measures and weights shall be uniform, according to the word of God in the Koran. Therefore the harbour-master his police and the servants of the Warden of the settlement shall patrol (*bĕrsimbang-simbang*) the market at night, first forbidding with beat of gong persons from walking about without torches, arresting offenders and slaying those who resist. The harbour-master may confiscate the weapons of persons arrested. If a slave of the Raja or of a chief be arrested, he shall be handed over to his lord or master on payment of a fine; and their weapons may be redeemed on payment of 1 or 2 *kupang* to the patrol.

29. If a stranger brings a suit, the two parties shall appear before the harbour-master in the presence of the Warden of the port. If a stranger sues a native of the State, the enquiry shall be in accordance with the law of the State and (?) the complainant shall be asked as to the law of his country. When (?)..... from the court of the Warden of the port or the court of the harbour-master or the court of the mosque, the complainant or the

party calling witnesses shall pay a fee: if the distance be from the court of the mosque to Pengkalan Besar 1 *mas*; if across the river at Pengkalan Besar, $\frac{1}{2}$ a *kupang*; if in the middle of the market or as far as Pampang Kechil, $\frac{1}{2}$ a *kupang*; if as far as the middle of the market, 2 minted (*têra*) *kupang*; if as far as Tanjong Angkusa, 6 minted *kupang*, and to the jetty at the end of the town near the mosque 2 *kupang*. If the enquiry cannot be at the court of the warden of the port, it shall be at the court of the Khankhan, where there are many authorities on Muhammadan law.

30. If a stranger buys slaves (*hamba*) for export, he shall pay a tax of 1 *paha* of gold a head and be given an export permit. If a stranger buys slaves (*sahaya*) and there is any dispute as to ownership, the harbour-master shall investigate.

31. Yearly the harbour-master and his police shall schedule the gifts made by captains (describing the different kinds of cloth), and the number, height and price of elephants bought by captains, so that it be easy to determine suits thereafter.

32. If any one arrest foreign runaways at sea and have to hoist sail to do so, he shall receive 1 *paha* of gold a head. The warden of the port and the harbour-master shall divide the reward into five portions and keep one portion.

33. When any one claims a sum deposited with the warden of the port and the harbour-master, the state takes half (*sa-bahagi*).

34. The customary dues from a ship from Kalinga are 400 *mas* and from a ship from Gujerat 600.

These laws were enacted at the time when Sultan Rijalu'd-din Muhammad Shah reigned at Naga. For when a country has fixed laws, many foreigners resort to it and the country prospers, even if the ruler is an infidel.

35. Letters from the Company are placed on *sêroja*, carried on an elephant, with a Chinese umbrella, 12 standards, drums and flutes, and on arrival at the *balai* are saluted with five guns.

So, too, letters from important merchants.

So, too, in the case of the Governor (*Kuarandor*) of Malacca, whose letters are received differently from those between Rajas, because salutes are a higher honour for an infidel of that kind.

Letters from the Raja of Patani are received with 16 standards, 2 white fringed umbrellas, a betel-casket (*jorong*), napkins, gongs, drums, flutes and trumpets.

Letters (ترکوس) are received with 20 standards, a fringed umbrella, napkins (*têta'pan* = *têtampan*), gongs, drums, flutes and trumpets: no cushion is used.

Letters from the Raja of Perak are received like letters from the Raja of Patani.

Letters from Jambi in Sumatra are received with 12 standards, a white fringed umbrella, an embroidered cushion (*lapek-nya sêroja*), gongs, drums and flutes but no napkins.

Letters from the Company at Malacca are received with 12 standards, umbrellas, an embroidered cushion, no napkins, gongs, flutes and drums.

Letters from the Phra of Ligor are received with 12 standards, a white umbrella, an embroidered cushion, gongs, drums, flutes, no napkins. Letters from the Raja of Ligor are received like letters from the Raja of Patani.

Letters from the Raja of Merdelang or the Awi of Singgora are received with 12 standards, a white umbrella, gongs, drums, flutes but no cushion or napkins.

In the time of Sultan Muhiyyu'd-din Mansur Shah, silver from the mint (*têra perak*) was escorted with two white umbrellas, 16 standards, drums, flutes and trumpets; copper from the mint with a Chinese umbrella, 12 standards, gongs, drums and flutes; and gold from the royal mint (*mas yang têtsikkah nama Raja itu*) with gongs, drums, flutes, brass trumpets, 2 fringed umbrellas, napkins and 2 yellow umbrellas.

Letters from the Company at Gujerat or Kalinga are received like those from the Company at Malacca.

36. Any person born of an untitled father, shall, if he run off with the daughter or debt-slave of another, be impaled and have a gong beaten (to attract notice) for three days. The son of a captain (*hulubalang*) who bore a title, shall, for a similar offence, be punished (*teazir*) for seven days. But the sentence lies at the discretion of the Raja.

37. The shore harbour-master and his police control the thoroughfares. The rent of a house is 1 *mas*. When Patani folk come to trade, the harbour-master and his police take them to the warden of the country, when they give presents of 3 *mas*, tobacco, gutta and gambier. Out of a score of bales, one is taken for the Raja. The police levy 1 *mas* on their return, that is, 1 *kupang* a man. The purchase of buffaloes must be reported to the harbour-master. Ten per cent is charged for collecting debts. If an embassy comes from upcountry from the Sedawa or Palasan road, it is under the control of the harbour-master.

Chapter II.

The Laws of Dato' Sri Paduka Tuan (1667 A.D.)

The Ruler dwelling at Kota Palas ordered Sri Paduka Tuan, the Mantri and Shaikh Alaidin to draw up a Code:—

(1) Thieves, robbers, cock-fighters, opium smugglers, gamblers, worshippers of trees and rocks, drunkards, all these sin against Allah and must be reported by the elders of a village to the headman (Kweng). Failure to report on the part of the elders or of the headman shall be punished.

(2) Headmen shall order villagers to observe the five times of prayer, the Fast and the Friday services. The recalcitrant shall be brought to the mosque with a yoke round his neck.

(3) Land owners shall pay religious tithes.

(4) Sales and Purchases should be reported to the headman, who after examination shall give a certificate. The slaughter of buffaloes and cattles shall be reported to the Headman, the head horns and hides being sent to him in return for his permit. The seller shall pay a tax of 3 *mas* and the purchaser 2 *mas*. The Headman shall arrest those who sell or buy cattle without reporting.

(5) After rice has been planted out buffaloes must be sent to a common. Rice-fields should be fenced with a fence of three bars. Anyone not sending his buffaloes to the common shall watch them day and night. The owner of any buffaloes that break a fence shall be fined. Anyone stabbing to death at night buffaloes that break a proper fence suffers no penalty.

(6) If a buffalo eats rice before the farmer's fence is complete, the owner of the buffalo shall not have to make good the loss and if the farmer stabs the buffalo he must make good the buffalo. If a buffalo eats the rice of a farmer whose field is fenced owing to the fault of his neighbour to complete his fence, the farmer who has failed to complete his fence shall pay compensation.

(7) Farmers whose crops are half grown shall help the neighbours to make fences. Anyone who fails to help may be scorched in the sun at the command of the Headman. If the fence of anyone helping shall be broken down by a buffalo his neighbour shall repair it and the owner of the buffalo shall be liable to pay compensation for the loss of rice.

(8) Penalties for the owners of male buffaloes which escape from their cords and damage rice-fields. Such buffaloes may be killed without compensation being paid for it; if they are captured only, the fine is one *mas* heavier than the fine for buffaloes breaking fences.

(9) If one half of the field has been reaped and the other not yet reaped, it shall be the duty of the owners of the unreaped portion to repair the fences.

(10) The Headman of every district should beat a gong ordering those who possess measures to bring them to be officially tested to see if they conform with the measures approved by the State. Any one who possesses dishonest measures shall be hit on the head with them.

(11) Anyone entering a compound or going out of a house at night without calling out may be lawfully slain. One cross-bar shall be counted as a fence for a compound.

(12) Anyone entering a compound by day without permission may be stabbed or killed by the owner. So too any stranger who goes as far as the verandah of a house when there is no man in the house may be killed.

(13) Any one wandering at night without a torch may be stabbed by the night watch if he runs away. If the night watch asks a wayfarer carrying a light "Where do you go?" three times and gets no answer and the wayfarer throws away the light and draws a weapon, he shall be arrested and may be killed if he resists, even if he is an emissary of the Raja or Chief.

(14) If two buffaloes fight and one is seriously wounded no compensation shall be paid. So too if buffaloes chase and kill or wound. But if a buffalo is known to chase, the Headman shall have a cross-piece put on the horns, and the owner if he fails to do this, when warned shall pay compensation for damage caused by the buffalo. If the buffalo's owner cannot be found, the Headman shall keep the buffalo and be paid one *mas* a day for doing so. If he uses it for dragging or ploughing, the fee paid shall be less. If the buffalo dies in the care of a Headman, he shall not have to pay compensation. Headmen shall instruct the owners of half-wild buffaloes not to tether them beside a road. If they disobey and wound a person, the owner shall pay compensation and if that person dies, the owner of the buffalo shall be killed.

(15) The owner of a *kampung* beside a road shall allow an access path to *kampongs* removed from it.

(16) Land without boundary-marks is counted dead and belongs to the Raja.

Ceremonial reception of the letter of investiture from Siam.

Chapter III.

The Qanun Law of Dato' Kota Star.

(1) In former times it was the duty of the Temenggong to build prisons, to arrest thieves, robbers, smugglers opium smokers, cock-fighters and gamblers. If the Temenggong were unable to arrest criminals, the Panglima of the country had to assist him. He also had to appoint watchmen for the country and have gongs beaten to prevent people wandering at night. If they had important business they had to carry torches. If they failed to carry torches they might be arrested and, if they resisted, slain. If a judge delivered sentence the Temenggong had to carry it out. If he put a man in chains he received a fee of one *mas*. If he carried out a sentence of maiming or executing he received no fee. The Temenggong had 60 men as watchmen: 20 men at a time guarded the jail and prisoners. If the defendants in a case did not appear, the Temenggong summoned them receiving a fee according to distance.

(2) There are four immutable rules for Rulers:-First to pardon the sins of their slaves, secondly to be generous, thirdly to inquire into offences and fourthly to carry out the law strictly.

(3) There are four attributes of Rulers:-First, courtesy of manners, secondly to issue orders without revoking them, thirdly to do good works and fourthly to suppress evil works. There are five words which are appropriate only to Rulers:-*titah*, *kami*, *kita*, *patek*, *derma*, *kurnia*. If a Raja's slave misuses these words, he shall be slain.

(4) The four persons whose words may not be disobeyed are: God, the Raja, a Teacher, a Father.

(5) Only a Raja may use yellow clothing, the square mats called *Petrana*, a fringed umbrella and a lance with branches.

(6) A bridegroom carried in procession may use yellow clothes and cloth of gold and a large umbrella; so too on a bier royal perquisites may be used. On a ship going to sea, on mosques and at landing places the form of roof reserved for rajas may be used: also by a highway ponds may be made and kiosks with the same form of roof, for the use of the raja when he travels or hunts.

(7) The flags on a ship reserved for the raja are yellow black or red. If a raja's flag is yellow, the flag of his vizier is black with red borders on top and bottom. If the flag of the raja is black, the flag of the vizier is red with the border at top and bottom. If the flag of the raja is red and black, the flag of the mantri is white with red border. The flags of captains are of three or five kinds: white, black, red, green and purple, without borders. When a raja travels to the mouth of a river, the Shahbandar shall precede

him holding a drawn sword. When the Laksamana goes to sea by order of the raja, he flies the red and black flag because he is a raja at sea: when he enters the river again he must remove that flag and fly a red flag. No one may disobey the order of the Panglima of the country, when the raja has ordered him to collect forced labour. No one may disobey the orders of the Paduka Raja when he carries out the work of the Panglima. No one may disobey the work of Temenggong when he is carrying out an execution ordered by the raja. Sharifs and viziers sit above the Panglima of the country when they are reading an ambassador's letter. No one may disobey a Bendara when he is arranging people in the hall of the audience or when the raja is travelling. The Bendara then stands with a servant holding an umbrella above him. No one may disobey the Maharaja Jalil when he is arresting offenders trespassing in a *kampong*. When a raja is travelling his slaves may take from any one that may carry food sufficient food for their needs. The slaves of a raja receive dresses from the Sri Perdana Mantri.

Chapter IV.

(1) A description of the golden flower which was sent as tribute to Siam. In the time of Sultan Mohamed Jemiwa 10 *mas* were added to its weight. A description of shields and spears sent with the tribute. In the year 1222 S.H. when Sultan Ahmad Tajud-din Halimshah was ruler, the height of the golden flower was raised, because the Raja himself went to do obeisance to the king of Siam.

(2) The list of regalia at the installation of a Raja of Kedah.

(3) The order of precedence at an installation.

(4) The ceremony at an installation.

(5) The perquisites and duties of a court herald.

(6) The duties and perquisites of the master of ceremonies (*Penghulu Balai*).

(7) The arrangements of weapons in the great hall. The hall for the State Band to be on the left of the State Hall and the hall of the captains on the right.

(8) In Johore the Raja flies a black flag and pennon on his ship, the Laksamana a red war flag, though at sea he can also fly the black flag. The State flag is yellow.

(9) The Bendahara acts for the Ruler in his absence or in the interval between the death of one ruler and the accession of another.

(10) The Kathi is king in questions of religious law.

(11) At sea the Laksamana can sentence or slay whom he will, because he takes the place of a Raja there.

(12) When the Temenggong goes the rounds with the watch he can kill any wayfarer that carries no light and slay him if he resists, even if he is a prince.

(13) A Bentara arranges persons in the hall of audience and may stand up even when Rajas and Viziers are seated. There is no need for him to bow to them.

(14) 20 flags, 2 white umbrellas, fringed umbrellas, yellow shoulder-cloths, gongs, drums and flutes are used to receive a letter of authority.

(15) The betrothal presents required of viziers, captains and common folk.

(16) Paduka Sri Perdana Mantri is the present title of the Bendahara. In old Johore the title Paduka Sri Maharaja was in use.

(17) The weapons and umbrellas carried at an installation.

(18) There are now two Panglimas in the country, one entitled Bendahara Perdana Sri Maharaja and the other Bendahara Muda.

(19) A list of the regalia and of those entitled to carry them.

(20) The order of precedence at an installation. The various ranks of vizier.

(21) The duties of the four Bentaras.

(22) Festivities at the Hari Raya.

(23) The order and duties of State officers.

(24) This custom came down from Rajas of old to the Ruler who died at Naga, thence to Dato' Besar, thence to the old Sri Paduka Tuan, thence to Maharaja che' Yusuf. They were given by the Ruler who died at Kimbang to Dato' Maharaja and one was given to the Dato' Sri Bongsu *i.e.* Paduka Sri Perdana Mantri who lived at Bukit.



Bab I.

Undang-Undang 1060 A.H. (1650 A.D.)

1. Pada tarikh sa-ribu enam-puloh tahun, tahun zai, pada tujoh-bêlas hari bulan Jumada'l-akhir hari Jumaat, bahawa pada kêtika itu maka ada-lah titah Shah 'Alam Yang Maha Mulia têrjunjong ka-atas Jêmala Paduka Raja suroh salin ambil taroh undang-undang pêrbuatan Dato' Bêsar dahulu, 'alaibi rahmatu'llah, supaya sudah-lah tahu hukum sadikit-sadikit.

Yang pèrtama bahawa akan hukum Kanun kita sêrahkan ka-pada si-polan mêmêrentahkan dia.

2. Jikalau ada orang itu pèrgi mari bèrniaga ka-nègèri, mahu-lah dèngan pèreksa; tatkala sudah pèreksa, maka bèri surat ka-nègèri, supaya lèpas masok; maka hasil-nya enam kupang êmas. Maka tatkala ia balek kèluar, ada ia mêm bawa kèrbau muatan, pada sa-ekor sa-kupang êmas di-ambil. Jikalau ada orang itu mêm bawa jual gajah, pada sa-ekor sa-paha êmas di-ambil. Dan jika ada orang mêm bawa jual sahaya, pada sa-orang sa-êmas hasil-nya.

Jikalau ada orang lari, jika di-pèroleh-nya di-dalam kita, sa-paha êmas hasil-nya: jika ka-luar, têngah tahlil hasil-nya; jika di-pèroleh dalam.....dan orang itu, di-bahagi dua hasil-nya.

Bèrmula, jikalau ada orang itu mari mêm bawa surat pada Raja, Mèntèri atau pada sama pègawai, tiada-lah hasil-nya di-ambil. Tètapi akan lèpas-mèlèpas masok itu, mahu-lah di-daftarkan oleh orang bèbèrapa banyak orang-nya dan bèbèrapa banyak kèrbau gajah-nya atau sahaya-nya dan bèbèrapa jénis banyak dagangan-nya, oleh Pangiima di-daftarkan ka-nègèri. Jikalau Panglima itu mêm bawa surat sa-kali pun, di-daftarkan juga, supaya sudah di-balai Raja Mantèri mêmanggil jénis dagangan-nya. Jika mênuyuroh raja-raja sa-kali pun, di-daftarkan juga—sèrta di-tolong jaga adat-nya,—banyak orang-nya dan jénis dagangan-nya, supaya boleh di-kètahui masok dan banyak-nya kèluar itu.

Sa-bagai pula. Jika orang lari ka-dalam, maka hëndak-lah tangkap: jika mèlawan, di-bunoh, mati sahaja; akan sègala harta yang di-bawa-nya itu jadi rampasan. Dèmikian-lah adat di-dalam undang-undang.

3. Ini-lah pèrkataan undang-undang pada zaman Raja Sètia Bijaya nama-nya dan Raja Jalil Putèra jadi Shahbandar; muafakat-lah Dato' Bêsar dèngan Orang Kaya Maharaja Indèra dan Orang Kaya Sèri Maharaja Khan-khan dan sègala pègawai: masa itu Panglima Bandar Dato' Laksamana Che' Shahdin.

4. Bèrmula ada-lah di-bicharakan Shah 'Alam yang maha mulia dan Yang di-pèrtuan yang maha mulia mênuyuroh pèrbuat undang-undang bandar ka-pada dato'-dato' yang tèsèbut itu, supaya tètap adat bandar dan pèkèrjaan Shahbandar dalam nègèri Islam.

5. Fasal yang pertama-tama: pēkērjaan kapal. Apa-bila datang kapal itu sampai ka-kuala, maka ia mēmasang mēriam alamat kapal datang. Maka hilir Panglima Kuala itu: di-pēreksai Panglima Kuala, "Kapal dari-mana datang ini? Dan apa nama nakhoda-nya dan bēbērapa banyak orang-nya? Dan bēbērapa panjang lunas-nya dan buka-nya, dan apa muatan-nya?" Apa-bila sudah tētap, maka Panglima Kuala mēmbēri surat ka-pada Shahbandar, mēmbēri tahu kapal itu, mēnyatakan sēgala hal ahual-nya kapal itu. Maka oleh Shahbandar di-bawa surat itu ka-pada Panglima Bandar maalumkan pada Raja. Maka ada-lah Panglima Bandar di-surohkan Shahbandar sa-orang mata-mata dari-pada Raja hilir dari-pada nēgēri pērgi mēmēreksai nakhoda kapal itu dan muafakat dēngan Panglima Kuala pada hal mēmasukkan kapal itu ka-dalam kuala, supaya tiada aral, dan bērkēnal-kēnalan dēngan nakhoda itu sērta mēmbawa hadiah akan nakhoda kapal itu dari-pada sireh, pinang, tēbu, pisang, dan nyior muda, ayam, barang sa-patut-nya. Apa-bila bērtēmu Shahbandar dan mata-mata dēngan nakhoda itu, mēmbēri hadiah akan kēdua-nya, sa-orang sa-hēlai puadam pandak. Maka Shahbandar dan mata-mata dan Panglima Kuala muafakat mēmudekkan kapal itu dan suroh chachak chachar pada gēlong sungai itu pada Panglima Kuala. Maka hadiah nakhoda kapal akan Panglima Kuala kain kira-kira sa-hēlai harga sa-paha ēmas. Maka apa-bila kapal itu sudah masok kuala, maka di-pēreksa oleh Shahbandar kapada kuni¹ (?), bērapa banyak bandēla-nya di-dalam kapal itu, dan di-pinta salin daftar bandēla di-dalam kapal itu; sudah di-salin daftar itu, tinggal mēnyēgērakan mudek kapal itu. Maka masa itu anak kunchi alamat pun di-ambil oleh mata-mata: tatkala hēndak mēmbuka alamat, mahu-lah mēmbēri tahu mata-mata; sēbab itu-lah di-ambil anak kunchi. Maka apa-bila mudek kapal nakhoda itu ka-nēgēri, maka hēndak-lah Shahbandar bawa.

6. Bērmula undang-undang ini Paduka Sēri Bongsu pakai turut pērentahkan; sērta di-nyatakan pada nakhoda itu mendapat Panglima Bandar. Maka hadiah nakhoda itu akan Panglima Bandar, jika kapal Kalinga-Kalinga², puadam panjang sa-hēlai harga-nya sa-paha ēmas; jika kapal Gujērat³, Bērochi sa-kayu. Sērta mudek itu di-angkat bandēla di-punggahkan: pada tiap-tiap mudek, bandēla itu mahu-lah di-surat Shahbandar di-kapal mēmbēri pada Shahbandar darat, supaya di-kētahui-nya sērta di-daftarkan banyak pērsēmbahan-nya akan Raja. Maka di-panggil oleh Panglima Bandar akan sa-orang saudagar di-dalam nēgēri di-nilaikan kain mēnētapkan janji saudagar akan pērsēmbahan itu; dan di-tilek Panglima Bandar dan Shahbandar rupa muatan-nya. Maka di-maalumkan Panglima Bandar pada Raja nakhoda itu akan mēngadap mēmbawa pērsēmbahan. Bērmula pada adat, kapal Kalinga ēmpat-ratus ēmas Patani; apa-bila kapal Gujērat, ēnam ratus ēmas: di-dalam itu di-tilek Panglima Bandar dan Shahbandar atas bēsar

1 کوني passim. 2 کالینگ and کالغ passim. 3 کجرت passim.

dan kěchil-nya dan atas muatan-nya. Dēmikian-lah di-bicharakan lēbeh kurang.

7. Fasal pada mēnyatakan kharajat nēgēri-nēgēri di-nyatakan oleh Shahbandar kēdua kapada nakhoda kapal itu, pērtama-pērtama hasil Panglima Bandar tēngah tiga tahlil, akan Panglima Nēgēri dua tahlil; akan Panglima Kuala tatkala masok sa-puloh ēmas, tatkala kēluar ēmpat-bēlas ēmas.

8. Fasal pada mēnyatakan hasil bandēla itu; pada suatu dua kupang pērolean Panglima Bandar. Sa-bagai pula hasil bangsal ēmpat bandēla sa-kayu bafta; jika kapal Kalinga, sa-kayu Sēlampuri itu pun pērolean Shahbandar kēdua dan sakai-nya mēnunggu bangsal. Pada adat dahulu-dahulu sēgala bandēla sakalian-nya di-masokkan ka-dalam bangsal dan sakai Panglima Bandar pula mēnunggu bangsal itu; kēmudian dari-pada zaman itu di-maafkan oleh Raja dari-pada masokkan ka-dalam bangsal bandēla itu, tētapī sapērti adat hasil itu di-ambil juga, tiada di-kurangkan dari-pada nakhoda itu. Bērmula hasil bilang ribu dua kayu di-ambil: pada kapal Gujērat dua kayu bafta; jika kapal Kalinga, dua kayu Sēlampuri pērolean mata-mata di-bawa ka-pada Raja, kurnia Raja akan mata-mata.

9. Jikalau, apa-bila sudah nakhoda itu mēndapatkan Panglima Nēgēri mēmbawa hadiah sapērti yang tērsēbut itu, maka apa-bila nakhoda itu hēndak bērbuka, maka hēndak-lah nakhoda itu mēndapatkan Panglima Nēgēri, di-bawa oleh Shahbandar kēdua sērta hadiah-nya: jika kapal Gujērat, haliya Bērochi sa-kayu; jika nakhoda Kalinga, kain puadam panjang sa-hēlai. Apa-bila di-bēnarkan Panglima Bandar buka bandēla itu, maka Shahbandar kēdua mahu-lah hadzir dēngan mata-mata tatkala bērbuka itu, sērta di-daftarkan oleh Shahbandar akan sēgala jēnis kain yang di-buka itu; dan akan mata-mata pun hadzir mēlihat bērsama-sama Shahbandar akan sēgala jēnis kain itu. Maka barang jēnis kain yang patut jadi faedah di-ambil bēli-bēlian kira-kira sa-bahagi dan sa-bahagi di-lēpaskan. Maka sēgala jēnis kain di-bawa oleh Shahbandar dan mata-mata ka-pada Panglima Bandar. Maka jēnis macham-macham kain itu di-maalumkan ka-pada Raja. Apa-bila sudah maalumkan, maka muafakat-lah Panglima Bandar dan Shahbandar dan mata-mata panggil sēgala saudagar mēnilaikan sēgala macham-macham itu. Apa-bila sudah putus nilai, maka di-daftarkan oleh Shahbandar sēgala kain itu, dan nakhoda pun sama daftarkan.

10. Shahadan jika nakhoda itu mēhēndaki mēmbēli rotan dan damar batu dan gētah dan tiang layar dan barang sa-bagai-nya, maka hēndak-lah mēmbēri tahu Shahbandar; maka Shahbandar-lah mēmbicharakan dia. Maka jika datang dagangan itu sakalian pada nakhoda, maka hēndak-lah mēmbēri tahu Shahbandar; maka nakhoda itu mēmbēli dagangan itu.

11. Shahadan hēndak-lah di-katakan pada nakhoda kapal itu dan saudagar: apa-bila bērjual-bēli bērtanggoh, hēndak-lah dēngan

tahu Shahbandar, supaya jangan jadi soal jawab; maka jadi sēsāl-lah pada akhir-nya.

12. Dan jika kapal itu mēmbēli mēmbawa utasan¹, sa-ēmas pada sa-orang hasil-nya pada yang mēnēbus, dan pada yang bērijual dua kupang: pada zaman dahulu kala tiap-tiap lēbeh pada yang mēnēbus dan pada yang bērijual sa-ēmas, maka dēngan chap Panglima Bandar; sēbab pun di-bēsarkan hasil kēluar itu, kērana di-tēgahkan Raja dari-pada bawa kēluar sahaya itu ka-nēgēri lain.

13. Bērmula jika ada piutang nakhoda di-dalam pasar, hēndak-lah di-bēri tahu Panglima Bandar dan Shahbandar, supaya di-kēluari oleh Panglima Bandar dan Shahbandar; maka hasil-nya pada sa-tahil sa-ēmas. Jikalau ada piutang itu pada Raja atau orang bēsar, oleh nakhoda mēmbawa hadiah akan Panglima Nēgēri ia-itu di-maalumkan pada Raja pohonkan† sama sēbok†² mēngēluari dia, maka hasil-nya dēmikian juga di-bēri Panglima Nēgēri akan sama sēbok itu. Maka sēgala yang bērhutang itu, apa-bila lampau dari-pada kapal itu bērlayar, maka kēna-lah atas yang bērhutang itu sapērti harga kapal.

14. Dan apa-bila kapal hēndak bērlayar, hingga sa-puloh hari atau tēngah bulan maka mahu-lah nakhoda itu mēmbēri tahu Shahbandar, supaya di-maalumkan oleh Panglima Bandar pada Raja, maka Raja pun bērlēngkap-lah pērsalin dan makanan akan pērjamu nakhoda.

Maka apa-bila sudah lēngkap, maka bērtitah-lah Raja pada Panglima Bandar suroh panggil nakhoda dan kurnia dan kab khiml³ Maka tatkala sampai mēreka itu, maka di-tanya. Maka di-nyatakan Shahbandar ka-pada hamba Raja yang mēmanggil itu, tiga orang itu-lah di-panggil. Maka tatkala sudah dērma kurnia pērsalin kētiga mēreka itu, maka masing-masing kadar-nya: dan mahu-lah Panglima Bandar bērpēsan pada nakhoda itu di-hadapan Raja barang alat raja-raja yang di-hēndaki pada nēgēri itu; dan jika nakhoda kapal itu mēmbawa surat, mahu-lah di-balas surat itu sērta dēngan bingkis mana kadar-nya. Maka tatkala sudah nakhoda itu mēn-junjong duli, maka ampun kurnia pulang-lah: maka surat dan bingkis itu pun bērsama-sama di-arak dan nakhoda itu pun sērta mēngiringkan surat itu, dan tandil dan† sama sēbok† mēngiringkan surat itu, dan anak hulubalang mēmangku surat di-atas gajah, dan sa-tēngah surat bērpayong ubor-ubor puteh dan dan sa-tēngah-nya bērpayong China dan sa-tēngah-nya tiada bērgajah, masing ia dēngan taraf-nya yang mēmbawa surat itu. Maka apa-bila sampai ka-rumah nakhoda itu, maka di-pērsalin oleh nakhoda itu akan sakalian mēreka itu, pada sa-orang sa-hēlai baju atau sa-orang sa-hēlai kain, masing-masing dēngan taraf-nya yang mēmbawa surat itu: bahawa akan gēmbala gajah dan orang gēndang sa-kayu kain Sēlampuri.

15. Dan apa-bila kapal itu akan hilir, mahu-lah Shahbandar dan mata-mata mēmēreksa kapal itu barang ahual-nya: apa-bila

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sudah di-pereksa Shahbandar, maka Panglima Bandar mēmbēri surat chap kapal itu ka-pada Panglima timbangan surat tandil kualā chachak chachar, hasil-nya tandil itu sa-paha ēmas: jika kapal itu mēmuat gajah, maka hasil titi sa-paha pada sa-ekor gajah.

16. Dan jika kapal pēnyuroh Kapitan dari-pada barang-barang tēmpat datang mēmbawa surat, maka tiada-lah di-tangkap tandil-nya dan rumah-nya pun di-hadzirkan. Adat pērsēmbahan pada Raja Mantēri dan pada sēga'a yang mēnanggong kērja, maka di-tēntukan dari sana dēngan suratan-nya masing-masing; maka tiada-lah di-bicharakan hasil-nya itu: tētapī jikalau kurang dari-pada adat, maka hēndak-lah di-nyatakan pada Kapitan-nya itu sēgala adat hasil nēgēri itu. Akan bandēla Company itu tiada masokkan ka-dalam bangsal. Jika ada bandēla, saudagar itu-lah mēnurut adat: dalam itu, jika di-aku oleh Kapitan itu, di-maafkan hingga di-bilang banyak-nya. Dan apa-bila Kapitan itu bērbuka bandēla, maka hēndak-lah di-daftarkan oleh Shahbandar dan mata-mata sēgala jēnis kain itu dan macham pun; di-ambil oleh Shahbandar di-bawa nyatakan ka-pada Panglima Bandar. Maka oleh Panglima Bandar di-maalumkan mana-mana jēnis yang hēndak di-bēli Raja itu bēbērapa banyak; maka di-nyatakan pada Kapitan itu sērta di-putuskan harga-nya. Maka hasil kharajat tiada-lah di-ambil hingga di-daftarkan juga; tētapī hadiah Kapitan itu mahu-lah ada kadar sa-paha ka-pada Panglima Bandar, dan Shahbandar dua ēmas, dan mata-mata sa-ēmas: jika saudagar yang di-dalam kapal yang sudah di-maafkan dari-pada kharajat. Tētapī sēgala bandēla, di-daftarkan sēga'a jēnis kain-nya itu oleh Shahbandar dan mata-mata dan macham-nya di-ambil maalum'an pada Raja; barang bērkēnan di-ambil bēli-bēlian akan Raja, tētapī hadiah-nya saudagar mēnurut sapērti yang tērsēbut dahulu itu juga akan Panglima Bandar dan Shahbandar: jika saudagar itu mēngēhēndaki bebas, mahu-lah ia mēmbawakan pērsēmbahan akan Raja sa-patut dēngan kadar-nya; atau ia mēngadap, maka ampun kurnia bebas-lah akan dia.

17. Fasal pada mēnyatakan sēgala pērahu Kalinga ataua lēmbu¹ datang dari jauh² atau dari-pada nēgēri lain, sampai ia ka-kualā atau di-batangan³, maka nakhoda di-panggil oleh Panglima di-batangan, di-pereksa sēgala dagangan nēgēri-nya tēmpat datang itu dan sēga'a jēnis dagangan yang di-bawa-nya itu dan bēbērapa banyak anak dayong dan bēbērapa sahaya laki-laki atau pērēmpuan. Apa-bila sudah pereksa, maka nakhoda itu mēmbēri hadiah akan Panglima bēatangan itu: jika Kalinga bērmuat garam, tēngah dēpa-lah dan kēbēratān kira-kira sa-bidor harga-nya. Maka oleh Panglima batangan bēri surat pada nakhoda itu suroh sampaikan pada Shahbandar; ia mēnyatakan sēgala ahual pērahu itu tēlah di-pereksa; maka rupa yang di-pereksa itu pun di-nyatakan dalam surat. Maka tatkala sampai pērahu itu ka-labohan, maka surat itu di-sampaikan pada Shahbandar; maka oleh Shahbandar di-bawa

¹ لمبو² جاوه ? = Jawa.³ بتاغن

nakhoda itu ka-pada Panglima Bandar: maka hadiah nakhoda itu akan Shahbandar kira-kira enam kupang dan hadiah akan Panglima Bandar kira-kira tiga emas. Maka oleh Panglima Bandar itu di-maalumkan pada Raja segala ahual-nya nakhoda itu.

18. Dan jika përahu itu muatan empat-puluh koyan, di-ambil bëli-bëlian mana-mana sa-patut-nya: maka pada adat mëngambil bëli-bëlian itu mahu-lah kira-kira akan bahagi tiga, dua bahagi akan maaf, sa-bahagi di-ambil. Maka di-kurangkan harga-nya, jika garam itu, sa-koyan enam emas. Akan rupa-rupa kurangkan juga. Jika di-ambil bëli-bëlian, mahu-lah përsëmbahan enam kuncha dan hasil Panglima Bandar enam kuncha, jumlah dua-lapan kuncha, sërta rupa-rupa mana patut-nya pada bichara yang mënanggong kërja. Maka hasil yang dua kuncha itu di-bahagi tiga, dua bahagi akan Panglima Bandar dan Shahbandar enam: tëläh têngah sa-bëlas gantang. Maka yang dëmikian itu di-këluarkan bahagian mata-mata dari-pada Panglima Bandar sana-lah dan dari-pada Shahbandar têngah naleh, jadi têngah dua naleh: sa-bahagi pula di-ambil akan Panglima Bandar nëgëri dua-lapan naleh sërta rupa-rupa mana sa-patut-nya. Maka oleh Shahbandar di-bawa nakhoda itu mëndapat Panglima Nëgëri, dan mahu-lah Panglima Bandar dan Shahbandar bërbicharakan nakhoda Kalinga (?) Lombok itu: jika patut pada bichara, di-bëri nasihat bëri mëngadap Raja: maka di-tambahi përsëmbah dari-pada tëläh yang tërsëbut itu. Maka jadi bënär pada hati nakhoda itu mëngatakan diri-nya sampai ka-pada Raja, maka oleh Raja apa yang patut di-bebaskan-lah akan dia: maka itu pun jadi tëtäp-lah sampai ka-pada Raja masa ia mari këmudian.

19. Bërmula ada pun përahu itu, jika (?) lëmbu kira-kira muatan dua-puluh koyan, maka di-ambil hasil-nya empat kuncha: dalam itu di-ambil Panglima Bandar sa-kuncha; dalam itu di-bahagi tiga; akan Panglima Bandar enam naleh lima gantang, Shahbandar tiga naleh têngah tiga gantang; maka di-këluarkan mata-mata dari-pada Panglima Bandar enam gantang dan dari-pada Shahbandar tiga gantang. Dëmikian-lah di-hisabkan.

20. Jika përahu itu muatan sa-puluh koyan atau lima koyan itu, sampai-lah ka-pada Panglima Nëgëri hasil-nya; apa-bila kurang dari-pada lima koyan, hingga Panglima Bandar dan Shahbandar juga yang boleh hasil-nya: maka akan hisab përbahagian sapërit yang tërsëbut dahulu itu juga, jangan bërsalahan. Dan jika tiada ia bërmuat garam, maka di-kira-kira muatan-nya itu dëngan harga garam. Dan apa-bila nakhoda itu mëmbawa tëbusan jual di-dalam nëgëri itu, hasil-nya akan, Panglima batangan, pada sa-orang sa-ëmas: dëmikian-lah di-kira-kira ia.

21. Jika orang mëmbawa tëbusan këluar, hasil-nya Panglima batangan dua kupang: maka tatkala nakhoda itu ia bërjual akan tëbusan, di-ambil hasil-nya oleh Panglima Bandar pada orang bërjual itu empat kupang dan pada orang yang mënëbus dua kupang sërta di-bëri surat chap Panglima Bandar ia tanda putus tëbus; dëmikian-lah adat tëbusan yang datang dari luar.

22. Jika përahu mēmbawa timah dari-pada nēgëri Perak atau nēgëri lain, maka hēndak-lah di-përeksai oleh Panglima batangan sërta tatap lihat di-atas petak: apa-bila sudah tatap, maka di-nyatakan oleh nakhoda itu sa-kian banyak; apa-bila bērbētulan dēngan orang yang mēnatap itu, maka di-bëri surat oleh Panglima batangan pada nakhoda itu suroh sampaikan pada Shahbandar; maka hasil-nya batangan tatkala nakhoda itu ia mēndapatkan Panglima batangan, dua bidor; kēmudian pula di-ambil hasil tafahus pada sa-bahara sa-bidor akan jadi pëluru dan mēmbëli ubat bēdil sēnjata batangan itu. Apa-bila tiada surat dari-pada Panglima batangan ka-pada Shahbandar, maka di-hukumkan atas nakhoda itu di-gok¹ sërta di-ambil bēli-bēlian dua kēndëri. Akan dari-pada përahu orang yang mēmbawa surat itu ka-pada Shahbandar dan sēgala nakhoda itu mēmbawa surat dari-pada Panglima batangan ka-pada Shahbandar, hadiah-nya dua bidor maka di-bëri oleh Shahbandar. Maka hasil tafahus itu pun baharu di-tambah zaman Sëri Johan Pah'awan; dahulu sa-bidor jua mēnunggu kualā. Bërmula jika përahu itu bërnuat timah ēnam bahara, di-ambil bēli-bēlian dua bahara, ia-itu di-kurangkan harga-nya pada sa-kupang sa-kupang ēmas dari-pada harga pasar; kërana timah itu bukan bēlanja dagangan; sapërta kain juga; akan timah itu dagangan bësar di-dalam nēgëri ini, kërana kapal Gujërāt mēhēndaki dia dan kapal lain pun sa-tēngah mēhēndaki juga.

23. Maka tiada-lah di-hukumkan jual bēli dēngan timah; dan jika di-hukumkan, timah itu tiada di-bëri bërniaga dēngan timah, tiada-lah raya bandar dukil² hasil daching dari-pada itu dan tiada-lah timah itu datang dari-pada nēgëri lain dan dari-pada jajahan nēgëri pun. Maka ada pun yang di-tēgahkan oleh Raja dari-pada mēmbë'an'akan dia timah dari-pada sa-bidor dan sa-tampang dan sa-pēnjuru dua pēnjuru mēmbëli sireh pinang dan tēmbakau, dan yang di-jadikan, itu-lah yang di-tēgahkan oleh Raja dan orang bēkërja. Sërta di-chanangkan barang siapa dari-pada tēgah Raja itu di-sulakan³ tiga hari di-dalam pasar; maka chachak sula nya itu tiga tēmpat dalam pasar; maka arok-nya⁴ tērēmas itu di-tētakan rupa-rupa. Dari-pada kërana itu-lah ahual përkataan timah ini di-nyatakan dalam undang-undang pada kēmudian hari-nya, jangan t'ëroleh orang lain kēmudian-nya.

24. Dan apa-bila nakhoda itu mēmbawa surat dari-pada utusan dari-pada sa-buah nēgëri atau pësuroh orang bësar-bësar dari-pada lain nēgëri ka-pada orang bësar-bësar nēgëri ini, maka tiada-lah di-ambil kharajat ka-pada-nya.

25. Apa-bila përahu dagang këluar, maka hēndak-lah tafahus dan përeksa oleh Shahbandar dan mata-mata barang yang ada dagangan-nya yang di-larangan, jangan di-bëri këluarkan surat di-lëpaskan batangan. Maka hasil surat itu di-ambil oleh Shah-

1 دگو، gok = prison. 2 دوکیل 3 سلاکن 4 اروقن

bandar dua orang sa-kupang, melainkan nakhoda dan sahaya sa-orang di-léaskan dari-pada hasil itu.

Dan sa-tengah pérahu itu barang yang di-béri Panglima Bandar surat chap-nya, maka tiada hasil-nya itu béroleh Shahbandar; dan lagi apa-bila berpésan Panglima Bandar pada nakhoda itu, barang yang di-kéhéndaki Raja dari-pada nêgêri yang di-kéhéndaki pergi itu, maka nakhoda itu kèpêrchayaan, maka di-kira-kirakan timah itu atau dagangan ka-nêgêri itu suroh bëlikan pada nakhoda itu.

Sa-bagai: hêndak-lah Shahbandar pèreksai, kalau-kalau nakhoda itu mêmbara utang-utangan orang atau anak orang atau orang yang kèna daawa atau sahaya orang: apa-bila sudah habis pèreksa dan tatap pérahu-nya, maka di-béri surat léaskan ia hilir nakhoda itu: dan jika ada nakhoda itu mêmbara sêgala yang têrsêbut itu, rampas-lah oleh Shahbandar akan nakhoda itu.

26. Fasal pada mênayakan pèkêrjaan Shahbandar dan mata-mata kèrah sêgala saudagar mêmbara pèrsêmbahan akan Raja di-himpunkan pada Panglima Bandar. Ada pun banyak pèrsêmbahan pada adat-nya Panglima Bandar sa-paha, dan pèrsêmbahan Shahbandar dua êmas dan sêmbah-nya sêgala saudagar dua êmas dan sa-êmas: di-kira-kira ia mana patut-nya kadar-nya; yang ada sa-paha pun: dêngan bichara Shahbandar dan mata-mata akan pangkat méréka itu. Têtapi pada adat-nya mahu-lah Raja mênghantarkan daging kèrbau dan lèmbu akan sêgala saudagar itu dêngan sa-kira-kira mana patut-nya, supaya jangan kèaiban Raja.

27. Dan pèkêrjaan Shahbandar dan mata-mata sêrta tēman-nya ênam tujuh orang, tiap-tiap hari di-dalam pēsara mēnatap sēgala pēkan pasar itu, kalau orang bērjudi dan mēnyabong dan bērtaroh, dan makan madat dan minum arak dan tuak, dan jual bēli dēngan tiada sa-bēnar-nya; mēlarangkan dari-pada orang bērkēlahi bantah. Maka sēgala yang di-tēgahkan shura itu, maka wajib-lah Shahbandar dan mata-mata tangkap, tētapi hēndak-lah ia muafikat dēngan bēntara di-suroh Panglima Nēgēri; dan jika mēlawan, di-bunoh di-rampas-nya sēgala bēnda yang di-larangkan itu; jika boleh di-tangkap, di-hukumkan dēngan taazir Raja: atas pileh Panglima Bandar. Dan mēlihat orang mēnyēmbēleh kērbau, jika tiada dēngan chap Shahbandar, tiada-lah bēnarkan sēmbēleh itu, kērana kērbau itu mahu-lah dēngan pēreksa Shahbandar mēnyatakan kērbau itu (dēmikian-lah ahual-nya) dan ia-itu tuan-nya. Dan jika dapat kērbau churi, maka hēndak-lah hukuman oleh Shahbandar, di-gantong kēpala kērbau pada batang leher-nya di-chanangkan tiga hari dēngan bērtēriak, "Bahawa kami mēnchuri kērbau! Tuan-tuan lihat-lah!" Jika pada bulan Ramdzan itu pun, lihat barang siapa tiada puasa di-dalam pasar itu, maka hēndak-lah sakai Shahbandar tangkap bēri makan rumput di-hadapan balai atau di-pukul atas kadar-nya di-tēngah pasar itu. Maka golok dan kēris¹ itu di-tēbus

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ambil sa-kupang. Sebab itu-lah tiada boleh di-tinggalkan pasar oleh orang berkerja.

28. Dan wajib menyuroh menyamai chupak dan gantang dan timbangan, jangan di-bëri këchik bësar, mahu-lah sama sakalian itu, kërana firman Allah taala, "Akul mikiyal wa'l-mizan" hërti-nya, "Hëndak-lah sëmputna oleh kamu sëgala sukatan dan timbangan sëgala isi nëgëri kamu." Maka itu-lah di-fardlukan atas sakalian raja-raja yang mëmpunyai këbësaran dan panglima yang mëmpunyai kuasa mënyuroh menyamai sukatan dan timbangan, kërana bëbërapa kaum Nabi yang dahulu-dahulu itu di-surohkan Allah taa'a mënyampaikan pada sëgala kaum-nya mënyamai sukatan dan timbangan; maka tiada-lah di-turut oleh mëreka itu, maka di-binasakan Allah taala rugi maka di-rugikan Jibrail, dan sa-tëngah-nya di-turunkan Allah taala ba'a bagi atas nëgëri yang tiada mënyamai sukatan dan timbangan itu ia-itu hujan api, dan sa-tëngah-nya këluar api dari-pada dalam kubor-nya ia-itu bumi. Shahadan maka hëndak-lah sunggoh-sunggoh kërasi suroh mënyamai sukatan dan timbangan itu, kërana pëkërjaan aniaya di-da'am hadith Nabi Muhammad Mustafa sallallahu alaihi wasallama pada sa-hari tujuh kali di-turunkan Allah taala laanat di-atas pësara itu: sëbab itu-lah Shahbandar dan mata-mata bërganti-ganti bërsimbang-simbang pada këtika malam sërta sakai Panglima Bandar. Maka waktu ia pëkërjaan simbang itu, dahulu di-chanangkan pada mëlarangkan dia orang bërjalan malam tiada dëngan bërdamar itu, di-tangkap-nya përtëgah¹, jika mëlawan pun, di-bunoh; juga; jika boleh di-tangkap, ambil sënjata-nya di-atas kadar-nya përo'lehan Shahbandar. Dan jikalau hamba orang raja atau orang bësar itu pun, di-ambil tëbusan juga; jika hamba raja, di-sërahkan pada pënghulu-nya; jika hamba orang bësar dan hamba orang, di-sërahkan pada tuan-nya. Maka sënjata di-ambil tëbus sa-kupang atau dua kupang akan di-përoleh-nya orang simbang itu.

29. Bërmula jika dagang bërdaawa, hëndak-lah mëngadap pada Shahbandar di-hadapan Panglima Bandar itu këdua mëreka itu: sudah itu, di-nyatakan hukum-nya. Jika dagang sa-orang bërdaawa dëngan anak nëgëri, bërsama hukum nëgëri mëmëreksanya, dan bërtanyakan hukum-nya pada daawa itu. Apa-bila mëninggalkan anak atau ² dari-pada balai Panglima Bandar atau balai Shahbandar atau balai masjid, mahu-lah upah oleh orang yang mëndaawa atau yang mëndirikan saksi: jika dari-pada balai masjid sampai ka-Pëngkalan Bësar, sa-ëmas; jika mënyëmbërang Pëngka'an Bësar, tëngah kupang; jika përtëngahan pësara atau hingga Pampang Këchil, tëngah kupang; jika hingga përtëngahan pësara, dua kupang tëra; dan jika ka-Tanjong Angkusa, ënam kupang tëra; dan jika dari balai Orang Kaya Khankhan dua kupang; dan ka-pëngkalan dua kupang ka-hujung pëkan sa-bëlah masjid. Akan përeksa-mëmëreksa itu pun, jika tiada di-balai Panglima

Bandar, di-balai Orang Kaya Khankhan pun dapat, kerana ia itu kepêrchayaan kerana tempat itu banyak hadir orang kepêrchayaan shara', tambahan Orang Kaya Khankhan itu kepêrchayaan Raja.

30. Jika dagang itu mênêbus hamba di-dalam nêgêri, hêndak di-bawa kêluar ka-nêgêri lain, kênalah hasil-nya pada sa-orang sa-paha êmas; maka di-bêri chap surat. Apa-bila dagang mênêbus sahaya di-nêgêri maka gadoh-bêrgadohan ia-nya, maka mahu-lah dêngan tahu Shahbandar; hêndak-lah ia di-pêreksa oleh Shahbandar. Kalau-kalau rayat atau sahaya, jika tiada dêngan tahu Shahbandar, hêndak-lah ambil oleh Shahbandar sahaya itu, maka di-pêreksa sahaya itu, sahaya orang-kah? di-churi orang-kah? jua. Apa-bila bênar-lah jualan, maka bênarkan-lah ahual-nya itu.

31. Dan pêkêrjaan Shahbandar itu ka-pada tiap-tiap tahun, mahu-lah di-daftarkan oleh Shahbandar dan mata-mata dari-pada pêsêmbahan nakhoda kapal taroh sêgala jênis kain, dan banyak gajah yang di-bêli orang kapal itu, tinggi-nya dan harga-nya sakian-sakian, supaya mudah mêmbecharakan pada tahun yang kahadapan.

32. Jika orang mênêdapat orang lari di-laut datang-nya dari nêgêri lain, maka kênalah gantong layar, pada sa-orang-lah sa-paha êmas di-pêroleh-nya pada yang mênêdapat itu, di-bahagi lima Panglima Bandar dan Shahbandar, mêm bayar dalam lima bahagi itu sa-bahagi bahagian Panglima Bandar dan Shahbandar.

33. Apa-bila datang tuntutan tunai-nya yang baik, di-bayar sa-bahagi harga, jadi hasil nêgêri. Sa-bêlum datang tuntutan tunai-nya orang itu, Panglima Bandar dan Shahbandar mênaroh dia.

34. Pada adat, pêsêmbahan hasil kapal Kalinga itu êmpat ratus êmas dan kapal Gujêrat ênam ratus êmas.

Maka undang-undang ini pêrbuat dari-pada zaman Sultan Rijalu'd-din Muhammad Shah sêmayam di-Naga, muafakat dêngan sakalian mantêri pëgawai dan pandita mêmbecharakan dia, supaya têtap adat ini, jangan-lah bêrubah-ubah. Tatkala têtap adat nêgêri, maka sêgala dagang pun banyak-lah mari ka-nêgêri itu; maka ramai-lah. Tatkala ramai, maka isi nêgêri pun jadi maamor; maka sêntosa-lah nêgêri itu. Maka ada-lah têrsêbut di-dalam hadith Nabi salla'llahu alaihi wa sallama, apa-bila raja-raja mênêetapkan adat, bagi raja-raja Allah sudhanahu wa taala mênêetapkan masa-nya; jika raja-raja kafir sa-kali pun.

35. Maka adat mênambut surat Company itu bërgajah, payong China, tunggul dua-bêlas, arak-arakan dêngan gëndang dan sêrunai, tempat surat itu sêroja: tatkala sampai ka-balai, di-pasang bédil kurnia lima kali.

Jika surat saudagar bêsar pun, dêmikian juga adat-nya.

Dan Kuarandur' Mëlaka pun sapêrti ini juga adat-nya mênambut, bërsalahan dari-pada adat mênambut surat raja sama

raja-raja mēnyambut dia; kērana kafir yang jēnis tērsēbut itu tērlēbeh mulia-nya pada bēdil.

Maka sēbab pun dēmikian, pērentah dan adat mēnyambut surat dari-pada Raja Patani, tunggu enam-belas, payong ubor-ubor puteh dua, bērjorong, bērtētapān, gong, gēndang, sērūnai, nafiri.

Bērmula mēnyambut surat Turkus¹, tunggu dua-puloh, payong ubor-ubor, tētapān, gong, gēndang, sērūnai, nafiri: kērana tiada di-buboh lapek-nya sēbab surat kuasa itu kēras.

Dan mēnyambut surat Raja Perak bērsamaan surohan dēngan surat Raja Patani.

Dan mēnyambut surat dari Jambi Sumatēra² tunggu dua-bēlas, payong ubor-ubor puteh satu, lapek-nya sēroja, gong, gēndang, sērūnai, tiada bērtētapān.

Dan mēnyambut surat dari Mēlaka, jika ia Company, tunggu dua-bēlas, payong, bēkas-nya sēroja, tiada bērtētapān, gong, sērūnai, gēndang.

Dan jika mēnyambut surat dari-pada Lakor (= Ligor), jika gēlar Phra³ tunggu dua-bēlas, payong puteh satu, bēkas-nya sēroja, gong, gēndang, sērūnai, tiada bērtētapān. Dan jika surat Raja Lakor, sama dēngan surat Raja Patani.

Dan jika surat Raja Mērdēlang⁴ atau Raja Singgora, jika gēlar Awai⁵, tunggu dua-bēlas, payong puteh satu, gong, gēndang, sērūnai, lapek surat-nya itu sēroja, tiada bērtētapān.

Dan mēngarak tēra perak, zaman Sultan Muhiyyu'd-din Mansur Shah payong puteh dua, tunggu enam-bēlas, gong, gēndang, sērūnai, nafiri. Dan mēngarak tēra tēmbaga, payong China satu, tunggu dua-bēlas, gong, gēndang, sērūnai. Dan mēngarak ēmas yang tērsikkah nama Raja itu, gong, gēndang, sērūnai, nafiri tēmbaga, payong ubor-ubor dua, tētapān, payong kuning dua.

Dan jika surat Company dari Gujērat atau dari nēgēri Kalinga sapērti surat Company dari Mēlaka juga.

36. Dan pērkataan undang-undang, apa-bila rayat bapa-nya tiada bērgēlar mēlarikan anak orang atau hutang-hutangan orang, hukum-nya (?) di-sula dan di-chanang tiga hari. Apa-bila anak hulu-balang bapa-nya bērgēlar mēlarikan anak orang atau tunangan orang, hukum-nya taazirkan tujuh hari, supaya jangan jadi tuladan ka-pada 'amm dan khas. Di-dalam itu lēbeh ijtihaht raja pula hukum itu yang mēngira-mēngirakan dia.

37. Dan adat pēkērjaan Shahbandar daratan dan mata-mata, pērtama lēmbōh rumah tēmpat dagang pērgi mari bērniaga. Maka sewa rumah itu sa-buah sa-ēmas. Maka apa-bila datang orang Patani bērniaga, Shahbandar dan mata-mata mēmērentahkan dia mēmbawa mēndapatkan Panglima Nēgēri; maka di-bawa-nya mēndapat kapit Panglima Nēgēri pula, sērta hadiah tiga ēmas, lain dari-pada tēmbakau dan gētah gambir pula. Tatkala sudah

1 ترکوس 2 جامي کمتر 3 کالر افرد 4 مردلغ 5 کالر اويا

mëndapatkan Panglima kědua, maka di-buka-lah sěgala bėli-bėlian ambil Raja; apa-bila ada lima kodi, di-ambil sa-kodi; jika lěbeh, di-ambil lěbeh; jika kurang dari-pada lima kodi, di-ambil juga sa-patut-nya. Maka hasil mata-mata sa-ėmas juga tatkala kėmbali, pada sa-orang sa-kupang; yang Panglima sa-orang tėman-nya maaf. Jikalau dagang itu mėmbėli kėrbau, mahu-lah kėtahui oleh Shahbandar. Dan mėngėluarkan piutang dagang itu, maka hasil-nya sa-puluh ėmas sa-ėmas. Dan jika utusan datang dari-pada sa-bėlah darat dari-pada jalan Sėdu¹ atau jalan Palasan² pėrentah Shahbandar; dan mata-mata-lah tunggul jaga tėmpat rumah utusan itu dan Shahbandar mėnyampaikan pada Panglima sěgala hal ahual dagang itu. Tammat al-kalam.

 1 سدو

2 فالسن

Bab II.

Tembera' Dato Sëri Paduka Tuan (1078 S.H., 1667 A.D.)

Hijratu'n-Nabi salla'llahu alaihi wa sallama pada sa-ribu tujoh-puloh dêlapan tahun, tahun dal pada bulan Rabbi-i'l-awal hari ithnain zaman hadzrat Maulana Shah Alam sëmamayam di-Kota Palas, pada kêtika itu bahawa titah Shah Alam yang maha mulia pada sêgala pëgawai yang tua-tua suroh përbuat undang-undang. Maka bichara oleh Dato' Sëri Paduka Tuan sërta Mantëri muafakat. Maka tatkala itu di-përbuat undang-undang; sudah, lalu di-maalumkan. Maka titah yang maha mulia suroh nyatakan pada Tuan Shaikh Ala-u'd-din dan pada sêgala pandita:—"Barang yang lazim pada hukum Allah taala, itu-lah kita suroh hukuman pada Panglima nêgëri dan kweng". Maka mêreka itu-lah jadi kêpërchayaan pada Raja.

1. Yang përtama kami nyatakan undang-undang: barang siapa mënchuri atau mënnyamun atau mënnyabong atau makan madat atau main judi bërtaroh-tarohan atau mënnyëmbah kayu-kayuan atau mënnyëmbah batu dan minum arak dan tuak atau mêngasi dan yang kilang¹ atau makan ganja dan bërbuat dia, maka kërja sakalian itu di-larangkan Allah subhanahu wa taala dan Rasul-nya: maka barang siapa ada pëkërjaan yang dëmikian itu, dërhaka ka-pada Allah dan Rasul-nya; maka hëndak-lah sêgërahan oleh sêgala yang bërkërja tobatkan, supaya di-ampuni Allah taala dosa-nya dan mëmohonkan ampun ka-bawah Duli Baginda yang maha mulia. Têlah di-ampuni kërja yang têlah lalu itu, maka di-kërkakan-nya pula kërja yang di-larangkan Allah taala dan Rasul-nya itu këmudian dari-pada tobat itu, maka hëndak-lah sêgala orang yang tua-tua bërkampong bëri tahu kweng atau panglima: maka apa-bila kêtahui oleh kweng atau panglima, maka hëndak-lah tangkap dëngan tikam-nya hantarkan ka-nêgëri sêgala yang dërhaka itu. Apa-bila orang tua bërkampong tiada mëmberï tahu kweng, di-taazirkan orang kampong itu, kërana ia sa-jahat dëngan orang jahat: apa-bila di-kêtahui oleh kweng tiada di-tangkap itu, kërana taksir-lah atas kweng, sëlalu ia mëmbenarkan orang yang dërhaka pada Allah dan Rasul-nya dan ka-pada Raja-nya.

2. Fasal yang këdua pada mënnyatakan hukum shara' Allah, Maka hëndak-lah kweng përeksa; pada masing-masing kweng-nya surohan sëmbahyang lima waktu dan puasa sërta sëmbahyang jumaat. Maka hëndak-lah sërta pëgawai masjid itu mëtazazirkan mêreka itu: apa-bila ia kërass, suroh tangkap bawa ka-masjid kakang leher-nya; apa-bila bërïkrar-lah ia mahu sëmbahyang sërta tobat, Iëpaskan dia.

3. Fasal yang ketiga pada menyatakan hukum undang-undang. Barang siapa berbuat bëndang atau huma, maka hendak-lah kërasi suroh këluarkan zakat; saperti bënar hisab-nya yang di-péroleh-nya itu, suroh këluarkan sa-puloh émas zakat-nya itu. Apa-bila tiada mahu mëraka itu saperti hisab itu, maka hendak-lah kweng kërasi këluar zakat itu, mënurut saperti hukum Allah taala.

4. Fasal yang keempat hukum undang-undang. Barang siapa berjual-bëli, mahu-lah di-nyatakan pada kweng. Apa-bila di-nyatakan mëraka itu, hendak-lah kweng mëmëreksa sërta bëri surat chap tanda sudah përeksa. Dëmikian-lah, jika orang berbantai kërbaulëmbu, maka hendak-lah nyatakan pada kweng; hendak-lah hantar kèpala-nya dan tandok dan bëlulang-nya ka-pada kweng akan hasil-nya surat chap itu; yang berjual tiga émas tëra dan yang mëmëbëli dua émas tëra; dan lain dari-pada orang khënduri dan bërkerja barang siapa tiada mahu mënghantarkan kapada kweng kèpala kërbaul dan tandok dan bëlulang-nya, maka hendak-lah di-ambil oleh kweng harga tandok kèpala dan bëlulang-nya itu këna tiga émas tëra. Barang siapa mëmëbëli kërbaul tiada dëngan sa-tahu kweng, maka hendak-lah tangkap oleh kweng hantarkan ka-nëgëri dëngan tëkah-nya¹. Barang siapa berjual-bëli kërbaul, maka tiada ia mënghambil chap surat ka-pada kweng itu pun, tangkap dëngan tëkah-nya hantarkan ka-nëgëri, kërana tiada ia bënar jual bëli itu: maka itu-lah tanda orang jahat pëkërti-nya.

5. Fasal yang kelima pada menyatakan hukum undang-undang. Jikalau sudah mënanam padi, maka hendak-lah sëgëra hantarkan kërbaul itu ka-padang bësar atau barang tëmplat-nya sërta sëgëra mëmëbakar bëndang itu mëmëbuboh rembat-nya tiga; maka pagar itu dëngan sirat-nya; maka tégoh-lah pagar itu ka-pada undang-undang. Maka barang siapa tiada mahu mënghantar kërbaul-nya pada padang-nya, maka hendak-lah kawal kërbaul-nya siang malam tambat tégoh-tégoh: jika mëmëbëlah ia kërbaul itu pada pagar rembat tiga di-makan-nya padi, maka padi yang di-makan-nya itu sa-përdua-dua pada sa-përdua-dua kupang tëra; dan jika pada siang, sa-kupang tëra; dan jika di-tangkap kërbaul itu, wajib-lah tuan kërbaul ganti padi itu; jika di-tikam orang pada këtika malam kërbaul itu mëmëbëlah pagar pada rembat tiga, jika mati kërbaul itu, mati sahaja-lah.

6. Fasal yang keenam pada menyatakan hukum undang-undang. Barang siapa tiada lagi sudah pagar-nya, maka di-masoki oleh kërbaul makan padi, tiada-lah bërganti, jika di-tikam kërbaul itu, bërganti kërbaul. Barang siapa sudah pagar-nya, maka di-masoki oleh kërbaul pada tëmplat pagar yang bëlum sudah itu, di-makan kërbaul padi orang yang sudah mëmëmagar itu, jikalau pada siang hariatas orang yang ëmpunya pagar itu-lah mënghanti harga-nya orang yang di-makan kërbaul itu; akan harga-nya pada sa-

pêrdua-dua sa-kupang têra; jikalau malam pun, atas orang yang êmpunya pagar juga mêngganti dia, pada sa-pêrdua kupang têra. Dan tatkala sudah bunting padi itu tiada-lah bêrharga itu padi di-makan, kêrbau itu-lah di-sêrahkan pada tuan kêrbau itu, jangan di-ambil jadi taksir tuan padi; maka turut pêroleh pada orang banyak dêkat bëndang itu, di-ganti padi binasa itu.

7. Fasal yang kêtujoh pada mênayakan hukum undang-undang. Barang siapa bêrbëndang têngah pênaiik, maka hêndak-lah ia mênolong orang di-têpi têngah pênaiik juga, pagar-nya maka rembat-nya tiga; jika tiada mahu ia mênolong, kêrasi oleh kweng di-jêmor atau'. Apa-bila kata-nya mahu mênolong mênurut sapêrti kweng itu maka lêpaskan-lah ia. Dan di-bêlah kêrbau pada pagar orang yang mênolong ka-têpi itu, maka pêrbaiki oleh orang yang êmpunya pagar-lah mêngganti orang itu; maka harga padi yang di-makan kêrbau itu sapêrti yang têrsêbut dahulu, itu juga harga-nya.

8. Fasal yang kêdêlapan pada mênayakan hukum undang-undang. Barang siapa mênarek kêrbau jantan, maka putus, makan padi orang, di-tangkap, maka kêna-lah sa-êmas êmas lêbeh dari-pada kêrbau mêmbelah pagar itu, dua kupang êmas pada sa-ekor kêrbau jantan atau bêtina; maka harga padi itu sa-pêrdua-dua kupang têra. Jika di-tikam oleh tuan padi, mati sahaja kêrbau itu, tiada bêrganti. Akan padi yang di-makan kêrbau yang di-tarang-tarang² di-dalam pagar itu, bêrganti juga; maka akan orang itu amar oleh kweng kêrana bêsar taksir atas tuan kêrbau itu.

Sa-bêrmula jika di-bêlah kêrbau yang lain pada pagar yang ada rembat-nya dua, dari kêrana sêbah mêlihat kêrbau yang di-tarang di-dalam pagar itu, maka padi itu pun orang mênarang kêrbau juga ganti padi itu. Bêrmula jika di-tikam orang kêrbau yang mêmbelah pagar itu, sêbab mêlihat kêrbau di-tarang di-dalam pagar itu pun, orang yang mênarang kêrbau itu juga ganti kêrbau itu.

9. Fasal yang kêsêmbilan hukum undang-undang. Apa-bila sa-têngah sudah mêngêtam, sa-têngah bêlum sudah mêngêtam lagi, hêndak-lah ia di-tunjokkan pagar itu pada orang yang bêlum sudah mêngêtam; maka kata-nya "Hamba sudah-lah mêngêtam; akan pagar hamba ini, kalau di-bêlah kêrbau atau gajah, tiada-lah hamba mêmbaiki dia; atas tuan-tuan-lah sakalian yang bêlum mêngêtam lagi, têlah hamba sêrahkan-lah pagar hamba ini". Maka barang siapa mêreka pagar itu-lah, ganti padi atau harga-nya sapêrti yang têrsêbut dahulu itu.

10. Fasal yang kêsapuluh pada mênayakan hukum undang-undang. Maka hêndak-lah kweng pukul chanang ka-pada daerah masing-masing kweng-nya itu; barang siapa ada mênaroh gantang dan chupak, maka yang tiada ada sama tolok-nya, maka hêndak-lah kweng suroh bawa ka-nêgêri minta tolokkan yang bênar-bênar sapêrti gantang sukatan nêgêri, supaya adil jual béli, maka jadi

bêroleh halal. Barang siapa mênaroh gantang atau chupak kêchil bêsar dari-pada sukatan nêgêri, pada hukum di-amb.l chupak gantang itu di-pukulkan kêpala-nya. Maka sêgala yang têrsêbut di-dalam surat ini maka hêndak-lah di-chanangkan masing-masing kweng; sêrta masa mêmukul chanang itu, di-kita, "Jangan siapa-siapa mênaroh gantang dan chupak kêchil bêsar yang tiada sama tolok-nya: pada hukum undang-undang amat bêsar hukum-nya".

11. Fasal yang kêsabelas pada mênnyatakan hukum undang-undang. Ada pun hukum orang yang mêmasoki kampong orang pada kêtika malam, tiada ia bêrsuara, jika ia di-bunoh orang yang êmpunya kampong itu, mati sahaja; maka tiada-lah hukum pada yang êmpunya kampong itu bêrpagar. Apa-bila naik orang ka-rumah atau-di-bawah rumah sa-kali pun, jika di-tikam oleh êmpunya rumah itu, mati sahaja. Ada pun alamat pagar rumah itu, jikalau palang pun, hukum-nya pagar juga.

12. Fasal yang kêduabelas pada mênnyatakan undang-undang. Jika orang masok kampong pada kêtika s'ang hari, jikalau tiada patah, di-larang, maka hukum di-tikam atau di-bunoh orang yang êmpunya kampong itu, mati sahaja orang itu; maka tiada-lah atas-nya kênâ hukum. Sa-bêrmula jika orang tiada pêrnah pêrgi ka-rumah orang itu, têtapi ia pêrgi itu hinggi sêrambi juga, apa-bila tiada tuan rumah yang laki-laki, jika di-dapati-nya oleh tuan rumah mëlampaui dari-pada adat-nya têmpat dudok-nya orang bênar, maka di-bunoh-nya, mati sahaja akan orang itu.

Di-dalam undang-undang ini pada pêrentah adat nêgêri kita ini bêrpatutan dêngan hukum Allah taala. Sa-bêrmula maka hêndak-lah suroh katakan pada pêrentah hukum undang-undang ini pada sêgala kampong dan dusun pada sa-tahun sa-kali; di-nyatakan oleh kweng pada daerah-nya.

13. Fasal yang kêtigabêlas pada mênnyatakan hukum undang-undang pêrentah simbang. Apa-bila sudah di-pukul chanang, jangan-lah bêrjalan malam mëlainkan bêrdamar juga. Maka jika bêrjumpa dêngan orang bêrsimbang itu, jika ia lari maka di-tikam orang simbang itu, mati sahaja. Dêmikian lagi orang mêmbara api, jika bêrtêmu dêngan orang simbang di-tanya dêngan tiga patah kata-nya "Hêndak pêrgi ka-mana ini?" maka tiada di-sahut-nya sampai tiga kali, maka ia mêmbara api lari atau mêngghunus sênjata, maka hêndak-lah di-tangkap; jika mëlawan, di-bunoh, mati sahaja, maka tiada-lah kênâ hukum atas yang mêmbara itu. Sa-bêrmula jika orang di-suroh oleh Raja-nya atau Pêngulu-nya, orang yang di-harap suroh itu, maka mati sahaja ia.

14. Fasal yang kêempatbêlas pada mênnyatakan hukum undang-undang kêrbau bêrlaga di-padang. Jikalau mati sa-ekor atau patah, tiada-lah bêrganti, sêbab bêrtêmu kêpala-nya. Sa-bêrmula jika kêrbau itu mêngghambat mêmbara atau mêmatah, itu pun tiada bêrganti, sêbab taksir tuan-nya. Sa-bêrmula jika kêrbau itu biasa mêngghambat, maka hêndak-lah mênggadap kapada kweng; jikalau tiada bêrkêtahuan tuan-nya, maka kweng-lah mênaroh

kərbau itu buboh tiling¹ itu; apa-bila tuan-nya yang hampir, hendaklah beri tahu tuan-nya, suroh pëlihara baik-baik sërta buboh tilang; dan apa-bila bantahan tuan-nya tiada mahu mënambat sërta buboh tilang kərbau-nya, jika kərbau itu mënghambat patah atau mati, kënalah ganti tuan kərbau itu. Akan kərbau yang tiada bërketahuan tuan-nya itu, apa-bila datang tuan-nya, maka pulangkan oleh kweng kərbau itu; maka ambil upah-nya sa-ëmas tëra atau barang patut-nya pada sa-hari mëmëlihara kərbau itu; maka di-suroh mënarek atau mënënggala atau barang sa-bagai-nya, maka kurang-lah upah-nya itu. Sa-bërmula jika mati kərbau itu dalam pëlihara kweng atau orang yang di-suroh kweng pëlihara, mati sahaja, kërana kweng itu wakil Panglima Nëgëri harapan Raja Mantëri. Sa-bërmula hendaklah kweng katakan pada barang siapa mënarang kərbau yang baharu ajar, jangan di-tambat di-tëpi jalan bësar, kalau-kalau ia mënandok orang lalu: apa-bila di-tarang juga hampir jalan, maka di-tandok orang luka atau mati, kënalah diat; jika mati orang itu, tuan kərbau itu pun di-bunoh, hukum-nya.

Dëmikian undang-undang ini muafakat dëngan dato' kathi dan haji yang bësar-bësar mëmberï undang-undang ini di-dalam tarikh sa-ribu tujoh-puluh dëlapan tahun.

15. Fasal yang këlímabëlas pada mënnyatakan hukum undang-undang pada hal jalan. Jika sa-orang kampung di-dalam sa-orang di-luar, jika tiada taroh jalan mënjadi tërpënjara-lah mërëka itu, maka hendaklah jalan adat-nya ënam hasta luas-nya, maka dapat lalu përusong itu-lah kira-nya. Di-bicharakan oleh sëgala arif, supaya jangan hamba Allah itu jadi bërbandah sama sëndiri-nya; tambahan pada hukum adat nëgëri pun, kërana jalan bësar pëkërjaan-nya jika sudah tiada bërjalan, tiada-lah dapat mërëka itu dudok pada tëmpat itu. Maka ini di-bicharakan hukum-nya, jika tiada-lah tuan tanah itu mahu mëm buka jalan, maka dapat di-bëli tanah itu ka-pada-nya, tiada mahu di-jual-nya tanah itu, maka hendaklah gagah buka juga jalan itu dëngan kékërasaan: apa-apa dapat di-kata oleh tuan tanah itu suatu pun tiada jadi përkataan. Dëmikian-lah hukum-nya.

16. Fasal yang kënambëlas pada mënnyatakan hukum undang-undang tanah mati dan tanah yang hidup. Maka hërti tanah mati tiada siapa mëninggalakan amarat², itu-lah hërti-nya tanah mati, hak Allah taala nama-nya, maka Raja ëmpunya mïlek itu. Jika ada sa-suatu amarat, hak u'l-Adam nama-nya. Maka tanah itu jika bërkehëndak di-pinta bëli pada tuan-nya, apa-kala kabul, sah-lah jual bëli: jika tiada kabul, tiada sah jual itu. Dëmikian-lah hukum undang-undang di-bicharakan oleh sëgala pandita yang arif: maka di-dalam itu di-bicharakan pula oleh ahli bichara bëbërapa pula lagi di-pëchahkan hukum-nya pada sëgala akil.

Pada mënnyambut pra mahakam³ itu dëngan sëgala pëgawai dan anak raja kësëmua-nya di-himpunkan di-bawa përgi dëngan sëgala

1 تبلغ

2 امارة Ar. = land-mark.

3 فَرَامَاكِن letter.

bunyi-bunyian dan pëndikar joget; maka kēsēmua-nya tiada-lah boleh dudok di-atas balai pēnghadapān hingga dua tiga bērgēndang; maka apa-kala sampai-lah pra mahakam itu, di-angkat naik ka-atas astana, yang di-rajakan itu-lah pērgi mēnyambut sēndiri di-bawa lētak di-atas gēta ēmas itu akan pērsalin dērma kurnia balut dan surat kuasa itu yokrabat¹ masok masa itu mēngirīng pra mahakam. Tatkala di-lētak Raja di-atas gēta ēmas, masa itu-lah Raja tua yok kam² dēngan palat yokrabat³. Dēmikian-lah adat Raja dahulu kala yang datang enggan mēnyērahkan nēgēri sērta mēmbēri nama sēgala raja-raja itu.

Surat ini di-salin dari-pada tēmbēra Dato' Sēri Paduka Tuan dan akan sēgala pērkakasan kērajaan itu Bēntara kēēmpat mēninggalkan dia. Tamat.

1 يوكيت provincial official, Siamese paymaster etc.

2 توي يقيم himself raises the letter of investiture reverently.

3 بلت يوكيت deputy Siamese official.

Bab III.

Hukum Kanun Dato' Kota Sëtar.

1. Fasal yang mënnyatakan undang-undang adat pëkërjaan Tëmënggong masa dahulu itu. Përtama mëmbuat pënjara; këdua mënangkap sëgala yang jahat ia-itu orang mënchuri dan orang yang mënnyamun dan orang makan madat dan orang mënnyabong dan orang mëmbunoh orang. Jika tiada kuasa Tëmënggong mëngambil orang jahat itu, Panglima nëgëri mënolongkan dia. Dan simbang dalam nëgëri: dahulu di-CHANANGKAN jangan siapa-siapa bërjalan malam: jika ada sa-suatu pëkërjaan bësar, mahu-lah bërjalan itu dëngan bërdamar; jika orang bërjalan malam tiada bërdamar, di-tangkap: jika mëlawan, di-bunoh, mati sahaja tiada sa-suatu hukum atas yang mëmbunoh itu, kërana ia mëlawan titah Raja.

Maka akan banyak orang Tëmënggong mëngawal nëgëri itu ënam-puloh orang bërganti-ganti.

Sa-bagai pula: pëkërjaan Tëmënggong itu, apa-bila orang bërdaawa sudah jatoh hukum, di-suroh Pënghulu Hakim këluarkan, maka Tëmënggong-lah mëngëluarkan dia; barang yang thabit pada hukum Allah taala: tiada boleh Tëmënggong itu mëmëreksa pandai sëndiri-nya mëngëluarkan itu, supaya tiada tëraniaya anak daawa itu: maka akan hasil Tëmënggong sapuloh ëmas. Jikalau orang kënà rantai-nya bëlënggu, hasil Tëmënggong sa-paha ëmas. Jika orang itu jatoh hukum di-kodong atau di-bunoh, maka tiada-lah hasil kapada-nya.

Maka akan sa-bagai lagi pëkërjaan Tëmënggong: ënam-puloh orang itu mahu-lah hadzir dua-puloh bërganti-ganti mënunggu orang di-dalam pënjara dan orang rantai bëlënggu itu.

Dan lagi pëkërjaan Tëmënggong itu: mëmbunoh ia orang yang jatoh hukum patut bunoh; mëngurong orang yang patut di-kurong pada hukum Allah taala.

Sa-bagai lagi pëkërjaan Tëmënggong: apa-bila orang bërdaawa, sa-bëlah anak daawa itu di-panggil hukum, tiada ia datang, maka orang Tëmënggong-lah mëmanggil dia; maka kënà-lah upah atas orang yang di-panggil itu, mëmberi mana-mana patut-nya; saperti di-Përlis upah-nya dua ëmas, dan ka-Pëdu dëmikian juga, jika Tambang sa-ëmas, jika ka-Pëtia dua kupang dan Tanjong Pauh pun dua kupang juga, anak Bukit atau anak Naga sa-kupang upah-nya; jika Phra mëngambil sahaya ia upah-nya pada sa-orang sa-ëmas upah-nya, ikut banyak orang-lah itu-lah di-ambil. Dëmikian lagi mëngëluarkan hutang piutang orang, sa-puloh ëmas hasil-nya. Tamat.

2. Fasal¹ mēnyatakan kanun, hērti-nya turun-tēmurun pēren-tah adat raja-raja itu: ēmpat pērkarā yang tiada boleh di-ubahkan, yang pērtama mēnganpuni dosa hamba-nya, dan kēdua murah tangan-nya, dan kētiga mēnyuroh pēreksa tēntukan kēsalahan sa-orang, dan kēēmpat mēlakukan hukum-nya yang sa-bēnar dēngan kēras.

3. Fasal pada mēnyatakan sharat raja-raja itu, ēmpat pērkarā: pērtama manis muka-nya, sēntiasa bērtitah pada sēgala hamba-nya yang di-bawah pēnghadapān-nya, dan kēdua titah yang tiada bērubah, tētapkan hukum mati di-matikan, hukum hidup di-hidupkan, hukum dēnda di-dēndakan, hukum rampas di-rampas-kan tatkala mēnghukum itu; dan kētiga mēngērjākan kēbajikan dan mēnyuroh mēngērjākan kēbajikan; dan yang kēēmpat tiap-tiap pēkērjaan kējāhatan itu, mēnyuroh ia akan mēnjadikan kēbajikan. Apa-bila tēntu-lah ēmpat pērkarā ini, bahawa sa-nya Allah taala mēnēntukan masa-nya Raja itu.

4. Fasal pada mēnyatakan hukum bahasa raja-raja itu lima pērkarā: pērtama 'titah', dan kēdua 'kami', dan kētiga 'kita', dan kēēmpat 'bērpatek' dan kēlima 'dērma kurnia'. Maka kēlima pērkarā ini tiada boleh bērkata-kata dēngan-nya mēreka yang kēluaran; barang siapa yang mēlalui akan dia hukum-nya di-bunoh, jika ia hamba raja, dan di-kujut mulut-nya jika ia kēluaran: supaya jangan mēnjadi tuladan ka-pada mēreka yang lain, kērana mēmpēsakai tulah papa sēbab Raja itu ganti Allah taala dari dunia ini.

(Empat pērkarā yang tiada boleh di-lalui pērkatāan-nya: pērtama Allah taala dan Rasul-nya, kēdua raja, kētiga guru, kēēmpat ibu bapa: jika di-lalui pērkatāan-nya, di-namai akan dia mēreka yang dērhaka. Bahawa sa-nya Allah taala tiada mēmbēri hikmat pada mēreka yang dērhaka). Maka ibu² bapa guru Raja itu di-namakan 'Ilah Hak', hērti-nya 'Tuhan yang sa-bēnar-nya', tiada di-lalui dari-pada kata-nya itu, dērhaka nama-nya; tiada di-sērtai Allah taala pada orang dērhaka itu.

5. Fasal pada mēnyatakan pakaian raja-raja itu ēmpat pērkarā: pērtama bērkain kuning, dan kēdua bērtilam pandak ēmpat pērsegi nama-nya pētērana, dan kētiga payong ubor-ubor, dan kēēmpat tombak bērchabang. Maka sapērti pakaian yang dēmikian, tiada boleh yang lain mēmakai-nya: barang siapa mēmakai-nya kēlak di-rampas.

6. Fasal yang mēnyatakan lima pērkarā yang boleh di-pērbuat oleh mēreka yang kēluaran, kērana maaf dan di-ampuni oleh Raja.

¹ §§ 2-4 are repeated below in the MS., word for word, except that the later version is longer. The passage is printed only once here: the additional matter from the later passage being bracketted.

² From here till the end of the paragraph occurs only in the first MS. passage.

Pertama di-atas mēmpelai yang di-arak, boleh ia memakai pakaian kékuningan dan pakaian bērmās dan bērpayong bēsar yang di-pēgang oleh orang, sērtā bērsorak-sorak: di-namai akan dia raja sa-hari, kērana putēra-nya pada sa-hari itu-lah raja ka-pada sakalian warith-nya.

Dan kēdua di-atas jēnazah boleh di-pērbuat mēreka itu raja 'diraja dan sayap lēlayang dan sulor bayong sērtā kain sampai, kērana putēra-nya sa-hari itu-lah hilang di-mata mēreka itu sakalian warith-nya: sakalian pēkērjaan itu tiada mēnjadi tulah atau papa.

Dan kētiga di-atas perahu yang di-bawa ka-lautan boleh di-buboh sayap lēlayang; maka pētua-nya tiada dapat pada kētika pērahu itu pinjam raja.

Dan kēempat ka-pada masjid boleh di-buboh sayap lēlayang; maka pētua-nya di-rumah Allah: apa-bila Raja bērangkat, di-pandang-nya masjid baik, nēschaya singgah ia sēmbahyang.

Dan kēlima di-atas pēngkalan yang bēsar-bēsar sērtā banyak orang pērgi datang, maka boleh-lah di-pērbuat jamban bērdinding papan dan bērsayap lēlayang.

Dan dēmikian jua pada jalan raya hēndak-lah di-pērbuat tēlaga dan balai bērsayap lēlayang; maka pētua-nya, tatkala raja bērangkat mudek, bila di-pandang-nya jamban itu baik, singgah-lah ia naik ka-sungai pada jamban itu; dan apa-bila bērangkat bērburu, bila di-pandang-nya balai dan tēlaga itu baik, nēschaya singgah ia di-situ, bērhēnti bērsēmāyam.

7. Fasal pada mēnyatakan tunggul bēndera raja-raja ia bērangkat bērpērahu, ada-lah tunggul-nya kuning atau hitam atau merah; salah suatu yang dēmikian pakaian raja-raja. Jika tunggul Raja kuning, maka tunggul mantēri hitam bērtēpi merah di-atas dan di-bawah-nya; jika tunggul raja itu hitam, maka tunggul mantēri merah bērtēpi di-atas dan di-bawah-nya; jika tunggul raja itu merah dan hitam, maka tunggul mantēri puteh bērtēpi merah. Dēmikian-lah adat-nya, kērana pētua-nya tanda ia mēmbēsarkan raja-nya. Maka tunggul hulubalang itu tiga jenis atau lima jēnis, pērtama puteh dan hitam merah hijau dan ungu: maka kuning itu tiada dapat siapa mēmakai dia: maka tunggul hulubalang itu tiada boleh bērtēpi di-atas dan di-bawah-nya, kērana yang dēmikian pakaian mantēri. Ada-lah adat tunggul mantēri dan hulubalang pada zaman ini bērubah.

Ada-lah kēbēsaran mata-mata pada masa ia mēnangkap pērahu dan lain-lain-nya ia-lah raja.

Dan kēbēsaran Shabbandar itu pada masa raja bērangkat di-kuala ia-lah dahulu sērtā memēgang pēdang bērchabut, bērganti-ganti tiada boleh dudok; ia-lah raja pada kētika itu.

Dan kēbēsaran Laksamana pada masa kēluar ka-laut di-suroh oleh raja; sērtā mēmakai ia tunggul merah dan hitam, kērana ia-lah panglima dan raja di-laut: apa-bila masok ia di-kuala, mēsti di-buangkan-nya tunggul itu, di-ganti-nya merah sahaja, kērana hukum yang dēmikian.

Dan kēbēsaran Panglima Nēgēri, pada masa di-titahkan raja bērkērah ia-lah raja, tiada boleh di-lalui sabda-nya.

Dan kēbēsaran Paduka Raja, pada masa mēngganti pēkērjaan Panglima Nēgēri, ia-lah raja pada masa itu.

Dan kēbēsaran Tēmēnggong itu, pada masa mēmbunoh orang dēngan titah oleh raja, tiada boleh di-lalui pērkataan-nya kērana ia-lah raja pada masa itu.

Dan kēbēsaran sharif dan mantēri pada masa mēmbacha surat utusan, dudok-nya di-atas Panglima Nēgēri, pada masa itu ia-lah raja.

Dan kēbēsaran Bēntara itu dua tēmpat: tatkala mēngatur orang di-balai pēnghadapan dan pada masa raja bērangkat atau bērarak, tiada boleh di-lalui pērkataan-nya kērana ia-lah raja pada masa itu, sērta bērdiri ia bērpayong bēsar di-pēgang orang.

Dan kēbēsaran Maharaja Jalil pada masa mēnangkap orang jahat masok ka-dalam kampong, di-bunoh-nya dēngan tiada di-pēreksa hukum-nya.

Dan kēbēsaran hamba Raja, pada kētika Raja bērangkat, bērjumpa ia makanan yang di-bawa orang, maka di-ambil-lah oleh hamba Raja itu sa-kadar chukup-nya makanan sa-orang, tiada-lah ada hukum-nya; pada kētika itu ia-lah Raja. Dan ada-lah sēgala hamba Raja itu, adat-nya di-pērsalin oleh Sēri Fērdana Mantēri.

Dari-pada hukum kanun Dato' Bēsar Kota Sētar masa itu.

Bab IV.

Bunga Mas, Alat Kĕrajaan Pada Masa Tabal, Orang

Bĕsar-Bĕsar, Adat Mĕminang.

1. Sa-bĕrmula banyak ĕmas di-tĕmpa bunga ĕmas di-hantar-kan ka-bĕnua Siam dua-puluh ĕmas masa Raja dahulu-dahulu: pada masa Sultan Muhammad Jĕmiwa tambah sa-puluh ĕmas, sĕbab sukar ia tĕmpa-nya itu: sudah tĕmpa, lĕbeh itu di-ambil pulangkan pada Raja. Pĕrtama di-tĕmpa itu sampak tombak dua, panjang-nya sa-jĕngkal tĕlunjok orang ugahari dan lebar pangkal-nya ĕmpat jari dan lebar kaki-nya tiga jari ujung, lalu di-pĕtĕri-nya. Dan batang bunga ĕmas itu bĕrat-nya dĕlapan ĕmas, panjang sa-tulang yang ugahari dan lebar kaki-nya ĕmpat jari, dan lapek kuntum yang di-atas itu tiga jari ujung, patah dĕlapan. Dan ranting-nya tĕmbaga di-lilit dĕngan ĕmas tujuh jari panjang-nya ranting yang di-bawah; dan pangkat yang ka-atas panjang ranting-nya ĕnam jari. Maka daun-nya itu sa-bĕsar-nya sapĕrti daun hinai yang ugahari dan panjang-nya buah sa-ibu tangan. Maka bĕsar buloh-nya sapĕrti jarum yang bĕsar. Kalang-nya di-pangkal ranting-nya itu sapĕrti buah jĕruju, panjang-nya sa-ibu tangan. Maka banyak ranting dua pangkat itu dĕlapan: maka banyak daun bunga ĕmas itu ĕmpat puluh perak sama juga kaki-nya itu bĕrlarek dan bĕrkĕlopak dan bĕrsĕngkang; maka tinggi-nya sa-tapak dan kĕlongsong-nya kutum bunga-nya itu di-lunas bĕsar-nya sapĕrti pinang muda yang ugahari, dan panjang kutum itu tiga jari ujung. Dan banyak perak rupiah bunga ĕmas itu dĕlapan rupiah: dan sampak tombak pun dĕmikian juga.

Fasal alat sĕmĕrap¹ bunga ĕmas perak itu, pĕrisai ĕmpat bĕrtulis, dan otar-otar sa-puluh, dan sampak tombak ĕmas dua dan panjang batang-nya tujuh jĕngkal; dan tombak sampak perak dua, panjang batang-nya sĕmbilan jĕngkal; dan batang lĕmbing sa-puluh rangkap panjang-nya batang-nya tujuh jĕngkal, lĕmbing tiada bĕrsampak, sa-kadar-nya bĕrsĕrambut bĕnang sahaja. Maka batang sampak itu ĕmas, kayu-nya kĕrmuning yang lain itu kayu sĕngkĕret. Maka pada zaman Paduka Sĕri Sultan Ahmad Taju'd-din Halim Shah ibni Sultan Abdullah Mukarram Shah naik kĕrajaan pada tarikh saribu dua-ratus dua-puluh dua tahun, (1222 S.H.) tahun alif, di-lĕbehhkan tinggi bunga ĕmas dan bunga perak, sĕbab Baginda sampai sĕndiri mĕngadap Raja maha bĕsar ka-bĕnua Siam. Maka alat yang lain sa-rupa pĕngiring bunga ĕmas itu juga, tiada bĕrubah, sapĕrti kĕadaan dahulu juga: mĕlainkan bunga ĕmas dan perak dan lĕmbing sa-puluh rangkap itu-lah di-pĕrbuat sampak tĕmbaga, Raja-raja

dahulu-dahulu berserabut benang sahaja. Ada pun banyak emas yang di-tempa perbuat bunga emas dan sampak tombak dua itu berat emas-nya tujuh ringgit; dan berat bunga perak dua-belas ringgit, kedua sampak tombak itu: yang lebih dari-pada tempa itu di-sembahkan balek. Maka tinggi batang bunga emas dan bunga perak itu sa-hasta orang yang ugahari, lain dari-pada kayu batang-nya itu, dan besar pangkal-nya sudah di-petëri empat jari lilit, dan besar ujung-nya tiga jari lilit kayu dalam-nya. Maka tiga pangkat ranting-nya; pada sa-gënap pangkat tempat chachak ranting itu berkalgan belah kongkong, dalam-nya berisi pendam, besar-nya saperti rotan sèga yang ugahari beradek-adek di-dalam tiga kalang itu jadi tiga kalang-nya tempat chachak ranting itu: pada sa-gënap sa-tingkat itu empat ranting-nya; pada suatu ranting itu dua-puluh di-tambah jënding-nya¹ di-petëri pada tengah ranting itu bersëliseh sadikit jadi berchabang tiga dëngan ujung ranting; jadi banyak ranting-nya dua-belas kësëmua-nya.

Maka banyak daun pada suatu chabang tiga hëlai dan buloh-nya pun tiga chuchok, saperti mali di-gantong di-hujung ranting tiga chabang itu. Akan tali pengarang bunga emas itu dëngan emas bunga perak, dëngan perak yang tëläh di-hunus bëri halus dari-pada kedua jënis itu: jadi pada suatu ranting sëmbaran hëlai daun dan sëmbaran buloh-nya, jumlah banyak daun-nya këtiga tingkat ranting kësëmua-nya chabang itu jadi sa-ratus dëlapan hëlai daun dan buloh-nya dëmikian juga. Maka besar daun-nya yang di-bawah sa-kali itu saperti daun hinai yang kèchil. Maka panjang buloh-buloh itu-lah, yang di-bawah sa-panjang lebar itu tangan orang yang ugahari, dan yang di-tengah saperti jari tengah, dan yang di-atas saperti lebar tëlunjok; dan besar-nya buloh sakalian ini saperti tulang daun nior. Maka sa-gënap hujung ranting chabang itu berbunga-lah, patah ënam, dan berkutum. Maka besar bunga lawang itu yang di-bawah sa-kali kira-kira dua jari hujung orang yang ugahari besar-nya, dan tengah-nya kèchil sadikit, dan yang di-atas sa-kali besar lebar ibu tangan yang ugahari, dan besar kutum-nya yang di-bawah saperti buah iëruju, yang di-tengah dan di-atas itu berturut sadikit kèchil-nya. Dan sa-gënap pangkal chabang ranting itu berdaun sonak di-atas përtëmuhan chabang itu, besar-nya dan panjang-nya saperti daun dëlîma yang kèchil; pada suatu ranting sa-hëlai daun sonak itu: jumlah dua-bëlas hëlai. Ada pun ranting dan janding-nya itu dari-pada tëmbara dawai, besar-nya saperti tulang nior yang sa-bëlah pangkal-nya, maka di-lilit dëngan emas bunga perak, ia lilit dëngan perak yang tëläh di-hunus; dari-pada kedua-nya itu sa-kira-nya itu, sa-kira-kira baik, maka di-pukul ia bëri nipis buat pëlilit ranting dan chabang itu. Dan këmunchak di-atas batang-nya itu berbunga lawang patah dëlapan, besar-nya tiga jari hujung yang ugahari: maka këdëlapan hujung bunga lawang itu di-gantong pula daun sa-hëlai bërtakok saperti dato' ka-darat²; maka besar-nya lebih

sadikit dari-pada daun yang pada ranting yang di-bawah sa-kali itu. Maka satu buloh akan jadi tali daun itu; maka panjang buloh itu tērpandak sa-dikit dari-pada buloh pada ranting yang di-atas itu, dan kutum kēmunchak itu panjang-nya tiga jari hujung yang ugahari, bēsar-nya saperti pinang muda yang ugahari; maka di-pahat pula kutum kēmunchak itu bērkelopak bērpuchok rēmbang. Maka sakalian daun dan bunga lawang itu kēsēmua-nya di-koris saperti kēadaan ulat daun kayu: jumlah sakalian, dan dēngan daun sonak, dan yang tērgantong pada bunga lawang kēmunchak itu, jadi sa-ratus dua-puluh lapan hēlai; dan jumlah, dan bunga lawang sakalian kēchil bēsar dēngan di-atas sa-kali jadi tiga-puluh tujuh. Dēmikian-lah kēmunchak kutum ranting dan kēmunchak yang di-atas jadi tiga-puluh tujuh juga, dan jumlah buloh-nya jadi sa-ratus ēnam-bēlas panjang kēsēmua-nya.

2. Alat kērajaan pada masa raja hēndak tabal itu: pērtama-tama pēdang kērajaan ēmpat bilah dua ēmas dua suasa, yang mēm-bawa-nya itu mēgat bangsa atau anak mantēri bērtampan kuning, dan bēnian dua bērsampul kuning, dan vang mēm-bawa pēdang itu sērta pērisai bērēmas dan puan kērajaan itu anak mantēri atau anak raja-raja, yang mēm-bawa dia, bērtampan kuning juga; sa-bagai pula baju bērantai anak hulubalang mēmakai dia dua orang sērta mēmba-wa bēdil bērsampul kēkuningan; sa-bagai orang mēm-bawa kayu kuning dua orang bērjalan dahulu; kēmudian bēdil kēmudian pēdang di-kanan kiri Raja: akan puan itu di-bēlakang Raja dēngan bēnian. Adat dahulu Raja hēndak tabal itu naik gajah bērjalan ka-masjid; balek-nya itu, maka di-naikkan atas sētaka di-tabalkan.

3. Pērentah tatkala tabal itu di-ator papan tiga saf, yang pērtama itu bēntara bērdiri dua orang atau sa-orang, di-chēlah bēntara itu Bēndahara sa-orang; ka-bawah sadikit dari-pada bēntara bērdiri itu saf yang kēdua anak raja-raja, di-kanan kiri raja-raja itu mantēri ēmpat; saf yang kētiga itu mantēri dēlapan bērdiri; di-bēlakang itu sēgala mantēri dan hulubalang pēgawai dan rayat hina dina, di-nyatakan papan itu bērna nama tapakan. Maka akan gēndang nobat itu di-hadapan bēntara. Sa-biit gong bēsar di-gantong pada balai itu; barang siapa hēndak di-adikan Bēndahara ia-lah titah suroh pukul gong itu tiga kali; sudah itu, maka ia pun mēnjunjong duli tabal.

4. Shahadan maka pukul gēndang nobat lagu Ibrahim Khalil u'llah. Maka mēnjunjong duli bēntara tiga kali ia-itu mēngatakan, "Daulat! tuanku". Maka sa-banyak-banyak mēnjunjong duli tujuh bingkas atau lima kali, sa-kurang-kurang-nya tiga kali; maka tiga kali anak nahara¹ itu di-kuraha-lah² gēndang nobat itu, tiga kali junjong duli, pada sa-kali kurah³ gēndang nobat itu; tatkala di-laku-nya gēndang itu, maka bērdiri mēnanti kuroh gēndang itu pula, maka mēnjunjong duli. Dēmikian-lah pērentah. Shahadan tatkala

sudah ia mēnjunjong duli itu, maka naik-lah bēntara ka-atas balai itu bērdiri di-tiang: maka raja pun bangkit pērgi dudok pada pintu tēngah. Maka bēntara pun mēnjunjong titah, dēmikian kata bēntara, "Titah duli yang di-pērtuan, Dato' Bēndahara titah di-panggil," dan "Maharaja titah di-panggil"; lēpas itu "Sēgala dato'-dato' titah di-panggil". Maka sakalian mantēri hulubalang itu mēnjawab kata bēntara itu, "Daulat tuanku!", lalu naik-lah masing-masing dudok pada tēmpat-nya; naik itu dēngan langkah tiga sambil mēnjunjong duli tiga kali sambil bērjalan. Maka sampai pada tēmpat-nya lalu dudok.

5. Maka adat bēntara itu sakai bebas-nya ēmpat puloh dan hasil surat ia mērdēheka dan hasil chap banchi raayat padi dan bēras bērsagantang itu boleh akan bēntara: sēgala taalok nēgēri itu dan hasil dagang sa-bēlah darat bērbahagi dēngan Shāhbandar darat; dan hasil titi muat gajah ka-kapal itu sa-bahagi akan Raja, pada sa-ekor gajah sa-paha hasil-nya; dan hasil pasar barang suatu daawa masok bēntara Shāhbandar; mēmbēla pēkan itu bēntara itu dēngan suroh Panglima Nēgēri; barang suatu kērja tiada boleh bērchērai dēngan Panglima Nēgēri. Dan harapan Raja bēntara itu: ka-mana raja bērjalan, tiada boleh tinggal bēntara itu, bērganti-ganti mahu-lah ada hadzir pada Raja atau pada Panglima Nēgēri. Akan pakaian bēntara itu tiada boleh lat pada kētika raja bērkērja atau utusan, supaya tiada aib raja-nya, kērana bēntara itu tēmpat majlis raja.

6. Shāhadan akan Pēnghulu Balai muafakat dēngan bēntara barang kērja pērentah balai itu: barang yang di-suroh kērjakan bēntara, kērjakan Pēnghulu Balai; akan sakai Pēnghulu Balai itu ēmpat-puloh bērganti-ganti mēnunggu balai itu, dan tikar balai itu pēnghulu balai buboh: akan hasil daawa itu boleh akan pēnghulu, ada suatu sa-paha, ada dua ēmas, ada sa-ēmas ada dua kupang, ada sa-kupang; atas banyak sadikit ia daawa-nya itu. Akan mēmanggil anak daawa itu pun Pēnghulu Balai di-suroh Pēnghulu Hakim, di-bēri upah-nya mana patut-nya dan jadi wakil daawa, jadi makanan bērtunggu balai; jika ada kērja yang bēsar-bēsar, pērentah balai itu mēngadu kapada Panglima Nēgēri barang kēkurangan itu.

7. Shāhadan alat kērajaan yang di-ator di-hadapan balai bēsar itu: pērtama payong ubor-ubor dan tombak chabang dan jogan dan sinar matahari dan tunggul: akan sinar matahari itu chērmin bēsar bērbatang. Shāhadan akan sēntaka' itu sa-bēlah kiri raja dudok; akan tombak di-ator itu bērchēmara kain kuning; dan balai gēndang nobat pun sa-bēlah kiri balai bēsar itu; dan balai hulubalang di-kanan balai bēsar. Ada-nya.

8. Adat Raja Johor: tunggul pērahu dan gada-gada hitam. Dan tunggul Laksamana mērpati sa-kawan dan tunggul pēpērangan merah; tētapi Laksamana pun boleh bērtunggul hitam di-laut kērana panglima laut: maka adat itu turut Raja-raja Kēdah itu; yang kērajaan itu kuning juga.

9. Shahadan kēbēsaran Bēndahada tatkala tiada di-dalam nēgēri ia-lah ganti Raja; atau Raja mangkat samēntara boleh di-ganti Raja, Bēndahara-lah ganti Raja.

10. Ada pun kēbēsaran Kathi tatkala ia mēnjabat hukum Allah taala; jika Raja sa-kali pun, tiada di-turut-nya kata mēlainkan ikut Allah taala itu-lah; jika Raja bērdaawa, pada sa-hari hēndak bērhukum itu turun-lah dari-pada kērajaan mēnērīma hukum Kathi.

11. Shahadan kēbēsaran Laksamana itu; tatkala ia kēluar ka-laut, di-suroh Raja; barang siapa di-hukum-nya atau di-bunoh tiada-lah taksir, kērana ia ganti Raja pada kētika itu.

12. Shahadan kēbēsaran Tēmēnggong; tatkala iaimbang bērkawal nēgēri, jika ia bērjumpa dēngan orang bērjalan malam tiada bērdamar, di-tangkap; jika mēlawan, di-bunoh-nya tiada-lah taksir, jika anak raja sa-kali pun, kērana dērhaaka pada Raja mēlalui titah.

13. Shahadan kēbēsaran Bēntara tatkala di-balai bēsar anak raja bērangkat ia-lah turut-nya sēgala mantēri hulubalang, kērana ia mēngator; lagi ia bebas, sēgala raja-raja mantēri dudok, ia sa-orang bērdiri; tiada adat Bēntara tundok lalu di-hadapan raja-raja mantēri. Ada-nya.

14. Shahadan pada adat mēnyambut tēra kuasa, tunggul dua-puloh, payong puteh dua, ubor-ubor, bērtampan, gong, gēndang, sērūnai, nafiri; maka tiada ia di-buboh lapek, sēbab kērana surat kuasa itu sudah ada tēmpat-nya itu kēras. Ada-nya.

15. Fasal pada mēnyatakan orang bēsar-bēsar mēmbawa sireh pinang. Anak mantēri sama mantēri khas ia-itu mantēri bēsar, jika sireh, sēmbilan bēkas; jika di-bawa bēlanja sireh, dua-puloh ēmpat ēmas bungkal sireh itu, chinchin bērat tiga ēmpat ēmas sa-bēntok, kain chindai atau madukara dua hēlai, sireh pinang tiga bēkas. Jika mēminang anak mantēri 'aam, sireh-nya tujuh bēkas, kain chindai sa-hēlai atau kain madukara, chinchin sa-bēntok bērat ēmpat-ēmpat; jika di-bawa harga sireh, dua-bēlas ēmas, lain dari-pada chinchin dan kain itu di-bawa. Kētika anak hulubalang mēmbawa sireh pinang itu, lima bēkas atau ēnam bēkas, kain sa-kērat, ēmpat ēmas atau lima ēmas, atau chinchin sa-bēntok bērat tiga ēmas atau sa-puloh kupang; jika di-bawa harga sireh itu, harga-nya dēlapan ēmas atau tujuh ēmas; lain dari-pada kain dan chinchin; dan kain tiada boleh tinggal. Jika anak raayat mēminang, bawa sireh ēmpat bēkas atau lima bēkas, dan chinchin sa-bēntok bērat ēnam atau tujuh kupang, kain sa-kērat harga-nya dua atau tiga ēmas; jika di-bawa harga sireh, lima ēmas atau ēnam ēmas; kain dan chinchin di-bawa juga tiada boleh tinggal.

16. Fasal pada mēnyatakan adat raja-raja yang bēsar dahulu itu. Jika bērgēlar Paduka Sēri Fērdana Mantēri, mangkubumi; dēmikian-lah zaman raja-raja dahulu itu. Pada adat raja-raja di-bēnua Siam, gēlar dēmikian itu bahasa Siam Chua Pia Kērsan¹

Maka pada zaman Raja Johor keturunan dari-pada anak chuchu Sultan Iskandar itu di-ubah pula di-gelar mangkubumi itu Paduka Sèri Maharaja. Maka pada bahasa Mèlayu Bèndahara itu panglima nêgèri pada sêgala nêgèri yang kèchil-kèchil: Bèndahara itu di-kata-nya ' lambat ' pada adat Siam: maka pada zaman kèmundian ini pun bèrgelar Paduka Sèri Fèrdana Mantèri itu kèrja Bèndahara.

17. Fasal alatan raja hèndak kèrajaan itu, pèrtama pèdang kèrajaan ènam bilah, èmas suatu sarong-nya dan suasa suatu dan yang kèèmpat itu mata-mata sahaja: dan otar-otar èmpat sama dèngan pèdang itu. Maka mèmbara pèdang itu anak Bèndahara dan Maharaja dan Tèmènggong dan Paduka Sèri Maharaja Jalil dan juragan itu ènam-bèlas orang.

18. Fasal pada mènayakan pèrentah turun Fèrdana Mantèri. (Pada zaman) raja-raja yang dahulu itu pèrtama gelar-nya Paduka Sèri Fèrdana Mantèri atau Fèrdana Mantèri ia-itu mangkubumi hèrti-nya panglima nêgèri itu Paduka Sèri Maharaja ia-itu Dato' Bèndahara. Maka tinggal-lah sudah gelar Paduka Sèri Fèrdana Mantèri itu: jika ada sama gelar kèdua-nya ini, jadi dua-lah panglima nêgèri: itu-lah tiada boleh ia gelar kèdua-nya itu sama ada hadir, mèlainkan hèndak di-jadikan panglima itu dua-lah. Maka pada raja-raja yang kèmundian ini lama-nya hèndak di-jadikan dua panglima nêgèri, sa-orang di-gelar Dato' Bèndahara Paduka Sèri Maharaja dan sa-orang di-gelar Dato' Bèndahara Muda: maka dudok-nya sa-orang di-kanan dan sa-orang di-kiri.

19. Fasal alat kèrajaan: pèrtama-tama puan anak-anak chètèria mèmangku dia; dan pèdang sarong-nya èmas dan pèdang bèrhulu suasa dua anak pètuanan dan anak maharaja mènanggong dia; dan pèdang bèrchabut èmpat bilah dèngan otar-otar bèrtulis atau bèrsampil kuning dan chogan kèrajaan dan tombak chabang ènam-bèlas banyak-nya bèrchèmara kuning, mèmbara dia anak hulubalang anak orang baik-baik, anak biduanda pun nama-nya. Maka hèrti-nya chètèria itu anak raja-raja dan hèrti anak pètuan itu anak bèndahara. Maka yang mèmbara itu anak hulubalang; jika tiada di-bawa-nya, maka di-ator bèrhadapan balai bèsar. Dan bédil èmpat puchok bèrsampil kuning itu pun anak hulubalang mèmbara dia dan kain kuning ènam-bèlas hasta panjang tiga hasta. Di-ambil ibarat dari-pada sènjata sègala pahlawan dahulu itu chokmar nama-nya, itu pun anak hulubalang dan orang yang baik-baik mèmbara bèr'al'an: jika tiada di-bawa, di-ator di-hadapan balai bèsar. Dan chèrmin bulan dua bèrada² bèrbulu mèrak, nama-nya sinar matahari, dan kipas bulu mèrak satu dan chèmèti dua di-bawa bèrjalan di-hadapan kiri kanan; dan payong ènam-bèlas, ubor-ubor kuning merah hijau dan puteh, dan tunggul dua-puloh: dan bènian dua di-buboh di-atas gajah anak mantèri mèmangku dia; puan kèrajaan itu anak raja-raja.

20. Maka tempat berdiri menjunjung duli itu di-ator papan tiga keping tapakan papan itu: maka yang berdiri pada papan pertama itu Bëndahara dan Bëntara, dan saf yang kedua anak raja-raja dan maharaja dan paduka raja dan mantëri, dan yang ketiga itu mantëri 'aam; di-bëlakang itu mantëri saf dan anak orang baik-baik dan raayat hina dina.

Maka sakalian fasal atoran dudok di-balai bësar. Di-bezakan mantëri khas dëngan mantëri 'aam, atau mantëri khas itu sama asal dato'-nenek-nya dua yang bërgëlar jadi mantëri 'aam itu, bahawa pada bapa-nya sampai pada diri-nya: jika asal mantëri 'aam bërgëlar "Paduka"; sama tara dua mantëri khas bërgëlar "Sëri"; jika bërgëlar "Maha" mantëri 'aam sama-lah tara-nya dëngan mantëri khas bërgëlar "Raja"; dëmikian-lah di-bicharakan atoran ka-bawah duli. Dëmikian di-bicharakan pula sa-orang bërgëlar "Sëri" di-nëgëri sa-orang bërgëlar "Paduka" di-hutan, sama tara dudok-nya; dan sa-orang bërgëlar "Raja" di-nëgëri sa-orang "Maha" di-hutan, sama tara dudok-nya itu; jika sa-orang bërgëlar "Tan" di-nëgëri, sa-orang bërgëlar "Raja" di-hutan, sama tara dudok-nya: hërti-nya sa-tara itu bërtimbangan dudok-nya: dëmikian beza di-hutan dëngan nëgëri itu.

21. Maka Bëntara itu ëmpat orang; dua di-kiri dan dua di-kanan: maka përentah kërajaan Bëntara itu ator-mëngator di-balai dan di-jalan bërarak dan sambut surat utusan datang ka-balai; këtika makan di-balai itu di-këpala sërambi kanan kiri Bëntara këëmpat itu dëngan sëgala mantëri; (dan lagi kërja Bëntara mën-junjung titah raja, suatu kërja) atau këtika makan itu sa-hidangan dëngan mantëri dëlapan itu di-balai bësar itu. Maka sa-bagai sakai bëntara itu ëmpat-puluh orang dan sakai Pënghulu Balai ëmpat-puluh. Suatu kërja di-balai muafakat-lah Bëntara dëngan Pënghulu Balai dan muafakat dëngan Rajong(?). Maka di-Rajong itu pun përentah dalam dan sëgala hamba ia-lah mënnyuroh akan dia.

22. Maka atoran dudok di-balai bësar itu anak raja-raja di-sërambi sa-bëlah kanan: maka këtika makan-nya di-balai rong itu dudok-nya di-kiri balai bësar ka-dalam balai bësar sadikit dan balai gambang itu di-dalam bër-këmbar balai bësar dan istana. Maka balai gëndang nobat itu di-kiri Raja, dudok-nya di-hadapan balai bësar, kiri kanan pintu itu. Maka adat pada këtika hëndak Hari Raya Haji, bërhimpun bërmain-main tiga hari dëngan joget pëndikar, mëndora, dan halau gajah ia-itu përuangkan gajah, bawa bërmain tiga pëtang; kë-ëmpat hari itu sëmbahyang raya-lah. Maka bëdil mëriam itu di-pasang sa-gënap pëtang sëm bilan puchok atau sa-bëlas puchok. Maka pada Hari Raya itu di-pasang bëdil pada waktu suboh sa-kali; Raja hëndak ka-masjid sa-kali; dan Raja balek dari masjid, sa-kali di-pasang mëriam itu. Maka dudok di-balai bësar itu di-sërambi sa-bëlah kanan itu Bëntara Kanan dan anak bëndahara dan anak maharaja dan mëgat bongsu dan anak mantëri dan anak hulubalang; dan di-sërambi kiri itu lakih dan haji-haji dan sëgala saudagar dan dagang. Ada-nya.

23. Fasal pada mēnyatakan gēlaran. Ada pun gēlaran Paduka Maha Mantēri itu ia-lah mantēri tua dan gēlaran Sēri Paduka Tuan itu Mantēri Tua taraf mantēri dēlapan, pēkērjaan-nya jadi pēnghulu hakim dan hukum. Maka yang di-namakan mantēri itu Paduka Sēri Fērdana Mantēri dan Maharaja dan Paduka Maharaja dan Paduka Raja dan Tēmēnggong. Maka Paduka Sēri Maharaja itu pun mantēri tunggul sa-orang-nya: jika ada Raja Muda di-atas-nya, maka gēlar Sēri Maharaja mangku putēra itu; bakal Raja Muda. Maka kēbēsaran Bēndahara itu, tatkala Raja tiada di-nēgēri, ia-lah ganti Raja. Maka ini di-gēlar mantēri dēlapan Paduka Sēri Maharaja Jalil dan Laksamana dan Tēmēnggong dan Maharaja di-raja dan Sēri Maharaja dan Sēri Maharaja Indēra dan Maharaja Putēra dan Sēri Maharaja Jalil; dan banyak lagi gēlaran mantēri dēlapan itu, banyak bērtukar; sa-tēngah ada sa-tēngah tiada bērgēlar. Kēmudian dari-pada itu mantēri dēlapan di-pērēnam-bēlas itu di-bicharakan patut bakal-nya itu. Akan kēbēsaran-nya Kathi itu, tatkala ia mēnjatohkan hukum Allah taala, maka raja mantēri pun turut kata-nya.

Dan kēbēsaran Maharaja jalil itu di-dalam barang sa-suatu pērentah, jika anak raja atau mantēri pun bērsalah dari-pada adat, bērjumpa di-dalam lawang di-bunoh-nya, tiada-lah suatu kata lagi, mati sahaja.

Dan kēbēsaran Tēmēnggong itu, tatkala ia simbang, jika ia bērjumpa dēngan anak raja atau mantēri dēngan bērsalahan dari-pada adat, patut di-bunoh, mati sahaja; jika tiada patut, di-tangkap di-pēreksa di-hukum di-atas-nya sa-patut kēsalahan itu.

Dan kēbēsaran Laksamana tatkala ka-laut ia-lah raja di-laut: tiada boleh sakalian mēlalui kata-nya itu; jika di-bunoh pun mēlalui tēgah larang, mati sahaja.

Dan kēbēsaran Bēntara itu tatkala di-balai Raja ia bērdiri; jika ia dēkat dēngan Raja atau anak-anak raja atau mantēri, tiada-lah salah, kērana bēntara itu bērjalan tiada adat ia tundok takhta.

24. Maka adat ini dari-pada raja-raja dahulu sampai pada Marhum Naga turun pada Dato' Bēsar turun ka-pada Dato' Sēri Paduka Tuan Tua turun ka-pada Dato' Maharaja Enche' Yusuf, di-kurnia Paduka Marhum Kimbang akan Dato' Maharaja sēgala adat ini, dan suatu di-kurnia ka-pada Dato' Sēri Bongsu ia-itu Dato' Paduka Sēri Fērdana Mantēri anak Bukit. Tammat.

Hikayat Ganja Mara.

By H. OVERBECK.

The Malay bookshops in Singapore and Penang have in recent years become uninteresting for the collector of Malay literature. The old books are gone, and few new ones are published, consisting chiefly of *shaer* moral and religious tracts. "Big stories" there are none; there seems to be no scribe to copy them for the lithographic press, beyond which most of the Malay publishers have not yet gone. Would there be readers to buy them were there any published? I feel inclined to answer in the affirmative; a few months ago a publisher in Penang was just printing the second volume of a "modern" story (as far as I remember a novel from Egypt) and had not a single copy left of the first volume, and I was told that the modern editions from Padang, e.g. the "*Chindur Mata*" in two volumes of some 400 pages, were finding a ready sale in the Straits. But generally the Malay publishers in the Straits seem to take a rather hopeless view of the future of the Malay book-market, and thus I was able to buy some time ago from one of the old Hajis the *Hikayat Bestammam* and the *Hikayat Ganja Mara*, which he had kept with the intention of having them re-written for his press, but he had given up the idea as he had been unable for years to find a competent scribe. He recommended the *Hikayat Ganja Mara* as containing many "deep sayings and mysterious hints" Printed copies of it appear in several catalogues of libraries of Eastern books, but I find no mention of it in any of the MSS-catalogues, and no synopsis of it. The story has probably come from Hindustan, though the note at the end: *tamat-lah mēnyurat Hikayat Ganja Mara ini daripada karangan saudagar putih* is somewhat disturbing. I hardly think that a "white merchant" composed the story and I translate: "copied from a manuscript in the possession of a white merchant". I think it worth while to give a synopsis of the book, firstly to show its merits which in my opinion would entitle it to a new edition (perhaps in the Malay Literature series?), and secondly in the hope of tracing, by publishing it in this Journal, its origin. In the works on Indian, Persian and Arabian literature accessible to me I have not been able to find the tale.

As regards the "deep sayings" of Malim Dewana, I am by no means sure that I have always rendered them correctly. Proper names, which are spelled differently throughout the text, I have transcribed as they occur the first time, unless a later different spelling made them more pronounceable.

The story of Ganja Mara relates the origin of the kingdom of Dul Akbar and its princes.

In Gangga Buana reigns Maharaja Shams Aalam of the house of Iskandar Dulkarnain; his friend and vizier is Mēntēri Anta

Dalus. The king has no children. One of the *biduanda* leaves at his death two daughters, Siti Khalilah and Siti Sēlih, who are brought up in the palace. The youngest Siti Sēlih, becomes the *gundek* of the king; the elder, Siti Khalilah, is married to Johar Salim, a *biduanda*. The king consults the fakir Malim Dewana about his childlessness, and the fakir prophesies that a son shall be born to him who will reign over the whole world and abolish idolatry. But there is a votive offering of the king's father, which has been forgotten; if that is sent to Mekka and Jerusalem, the king's desire will be fulfilled. A search is made in the treasure-chamber, and the package, containing jewels, is found, with an inscription blessing everybody who helps to send it to its destination. The king gives it to Anta Dalus and orders him to see that the vow of the late king is fulfilled. Malim Dewana returns after blessing the king and telling him in veiled words that now one has become three, and that neither sorrow nor futile joy will last for ever. Nobody but Anta Dalus understands his words. Siti Sēlih distributes alms in the hope that she will bear the son to the king.

The king dreams that a Sufi presents him with a diadem, which vanishes in his hands and becomes a mean coronet. Malim Dewana interprets the dream that the king's son will be separated from his father, that separation may happen three days or five years after his birth, but the king should not despair as none but his son will become king. The queen becomes pregnant, and the king's whole love turns to her; in vain Siti Sēlih tries love-philtres with the king, and magic to destroy the queen's unborn child. The wives of Johar Salim and Anta Dalus also become pregnant, and Anta Dalus sees Malim Dewana's prediction coming true. The king receives the news at the ritual bath of the queen in the seventh month, when he enquires after the two ladies who do not attend the ceremony. Siti Sēlih plans with her sister to exchange the latter's child with that of the queen.

On the same day three boys are born, the son of Siti Khalilah when the full moon just rises, the queen's son when the moon is just above the horizon, and the son of Anta Dalus when the moon is half way up the sky. The little prince has a shining mark on his brow and two birth-marks on his shoulders. Siti Sēlih is appointed nurse and allows no one else to bathe him; she sends a description of his birthmarks to her sister, who imitates them with a needle and chemicals on the body of her own son, but they do not shine. The little prince is watched by his father and the ladies of the court. On the third night the king falls asleep; Siti Sēlih drugs the ladies into a deep slumber, and Siti Khalilah's child is substituted for the little prince, who is brought to Johar Salim's house. With an antidote the attendants are brought back to consciousness; some of them suspect foul play, especially as the child's voice seems to have changed. Siti Sēlih explains that this often happens with babies and on the next morning applies to the court-physician for a remedy against fits. The king sends for Malim Dewana, and asks

how many marks there were on the body of his son. Malim Dewana replies that so far there are only three, but a fourth will come later to complete the number of the four directions of the wind, a sign that he shall reign over the four regions of the world. The king's question as to the coming separation Malim Dewana does not answer, but says in veiled words that it is useless to search the dispensations of God; the king has been spared sorrow and has been given joy, and more joy and happiness are to come.

Johar Salim invites Anta Dalus to his house to give his son a name. Anta Dalus recognises the prince, but says nothing and advises Johar Salim to name the child Kêta Buana (Kêta = Gêta). Anta Dalus is called to give a name to the little prince, who is brought into the hall of audience. He proposes the name Johar Aalam, which means "the jewel that illuminates the world," with the nursery name of "Taj Salim" which means crown of peace." The king agrees.

Siti Khalilah brings Kêta Buana to the palace. The king and queen are very pleased with the child, and the queen gives him the breast, wherein she finds a curious satisfaction, which Siti Sêlih explains is due to Kêta Buana being the elder of the two boys and sucking more heartily. The queen has him brought to the palace every day, and six months later the little son of Anta Dalus, called Thalib, is also brought daily to the palace by his mother. The three boys are brought up together; when they are two years old, a daughter is born by the queen and is given the name of princess Wajah al-Jamil. When three years old, the sons of Johar Salim and Anta Dalus come to live in the palace and are clothed and educated in the same manner as Taj Salim. Thalib forms a close friendship with Kêta Buana for whom the king and queen also conceive a deep affection. When the boys are four years old, the king gives a jewel to Taj Salim and Kêta Buana obtains the queen's favourite emerald-ring, which she is unwilling to give him until the king asks her to do so. Taj Salim wants that ring also; in the struggle Kêta Buana puts it into his mouth, and when Taj Salim tries to take it away, swallows it, but the ring sticks in his throat. The boy faints, and Anta Dalus runs with him to Malim Dewana. The *fakir* slaps the boy's neck, saying each time: "Come out, evil! remain, blessing". Kêta Buana swallows the ring and revives but Malim Dewana continues the slapping in spite of the boys' cries until Anta Dalus arrests his hand. Malim Dewana says: "Did you count how many times I slapped him? My intention was to do it thirty times, but nobody can add to or take away from God's dispensation, and if my wish is not fulfilled, you are the cause." Johar Salim and Siti Khalilah, who have followed Anta Dalus, ask the *fakir* to make the ring re-appear, as they are afraid of the queen's wrath. Malim Dewana sends the queen the message, that by its magic power the ring has mixed with the blood of the boy; it would re-appear the way it had gone after twelve years, and would return to the queen four years later,

when she should present it to Kēta Buana, who would watch over her children. Anta Dalus understands the allusion. Malim Dewana informs him that the ring has the power of guarding its owner against poison and all evil.

When the children grow up, Kēta Buana becomes the champion of princess Wajah al-Jamil, and everybody loves him whilst Taj Salim is not liked owing to his coarse behaviour. Once, when eating *mēmpēlam*-fruit, Taj Salim cannot manage his knife properly and eats the fruit with the peel. Kēta Buana chaffs him, and Taj Salim throws his knife at him, which sticks in Kēta Buana's breast. The boy asks the king to be excused from playing with Taj Salim, as it might cost him his life. Siti Khalilah's sister, brings Kēta Buana a present from the queen, a *kain* which the queen has worn. His parents resolve to maroon the boy on a distant island, as they are afraid that Anta Dalus suspects something, and they want to see Taj Salim on the throne. A friend of Johar Salim undertakes to take the boy away. The plan is carried out three nights later, after Kēta Buana has paid a last visit to the palace. Thalib had accompanied him home and stayed with him, and only late in the night, when the boys are fast asleep, Kēta Buana is carried on board a ship which leaves immediately.

Great is the consternation, search is vain, Johar Salim and Siti Khalilah are sent by the king to Malim Dewana, who tells them that the boy is safe beyond the sea and none but Thalib will be able to find him. Thalib is inconsolable and begs his father to equip a vessel for a search. Anta Dalus agrees, and, the king consenting, a trading vessel is filled with merchandise. Anta Dalus consults Malim Dewana, who laughs and says that if his son's name is Thalib, he has nothing to say, as Thalib means 'intently seeking' (*tuntut*). But the time has not come; and Thalib should wait in the South.

After an unpleasant voyage Kēta Buana is brought to Pulau Kubin, a desolate island and is put ashore with nothing but the queen's *kain* and no food and water. Under the pretence of fetching water the captain, who had carried the seasick boy ashore, returns to the ship and leaves at once. The boy is found by a Jin and carried to the interior of the island, where there is a kingdom of Jins, whose ruler is Maharaja Nila Suba, a Muslim. Nila Suba recognises the boy's origin and the blessing that rests on him: he adopts him and tells him that he is the son of the king of Gangga Buana, but that Siti Sēlih had substituted her sister's son for him. Anta Dalus had known that, and had given him the name of Kēta Buana. The wound which he had received from Taj Salim is the fourth mark. Kēta Buana should stay with Nila Suba to be taught every science, especially that of war. He should not grieve about his family; another sister would be born to him, and he would give them both away in marriage. Thalib had gone in search of him, but the time when they should meet had not come. Kēta Buana stays with Nila Suba, who calls him Ganja Mara.

Thalib reaches a country Tanjong Maya, where the captain starts trading. They search in vain for traces of Kēta Buana. Thalib is educated there. When he is 14 years of age, he resolves to go in search for Kēta Buana, accompanied by 10 friends. He sends the ship back to Gangga Buana to his father with a full report. Anta Dalus resigns himself to the will of God, but leads a retired life. The queen gives birth to a second daughter, princess Nur Aalam. Thalib has already wandered through many countries without hearing news of Kēta Buana.

Ganja Mara reaches his 15th year and has finished his education. He does not want to return to Gangga Buana, being ashamed to claim his birthright and Nila Suba suggests that he should meet Thalib, as the time for rejoining his family has not yet come. He gives Ganja Mara the sword of Alexander the Great, which must not be used by any but a descendant of that monarch and will protect him against wounds, hunger, thirst and exhaustion in battle. He gives him a jewel-box with a talisman, which will bring Nila Suba at once when Ganja Mara smells it. A Jin called Jēmbayu is ordered to carry Ganja Mara to the mainland. There Jēmbayu fights a Jin called Siungka, who disturbs the peace of the other Jins of the country, but Jēmbayu is defeated and has to flee. Ganja Mara finishes the Jin with his famous sword and carries off his quiver and arrows. Jēmbayu has returned to Pulau Kubin and Nila Suba is disturbed by the news of the fight, but by geomantic means finds that all is well.

Ganja Mara wanders over a plain, where he is unable to find food and water, and at last breaks down in the shadow of a tree. Thalib and his friends discover him in the last stage of exhaustion, and Thalib gives him a flask of water, which Ganja Mara empties at one draught. He vomits, the emerald-ring re-appears, and Ganja Mara drops in a dead faint. Thalib has a shelter made over him; he has forgotten the episode of the ring, but looking at the unconscious youth, he sees the mark on his brow and recognises Kēta Buana. He has him carried to a pleasure-park which they had seen the day before, lays him down in a summer-house, lights a fire and watches over his friend until he shall return to consciousness.

The park belongs to a Jin called Kubaya, who resides on mount Kēbewan. On his weekly visit to his garden, accompanied by his family, he discovers the visitors and hurries to attack them. Thalib snatches up the sword of Alexander the Great, and the Jin sees his mistake. He helps to revive Ganja Mara by means of water wherein the ring has been washed, and Ganja Mara tells him in the language of the Jins all that has happened. Kubaya informs him that the arrows of Siungka always return to the quiver after having been used. Kubaya is a brother of Jēmbayu and much concerned about the latter's fate; many years ago he has incurred the displeasure of Nila Suba and is afraid to visit him. Ganja Mara writes on a *jambu-ayer* leave with Jin-characters a letter to Nila Suba, wherein he relates his adventures, and Kubaya's assistance, and

asks Nila Suba to pardon him. Kubaya brings him food, and two of his sons, Tamsun and Jamsir, become Ganja Mara's servants; they are called by a ring and by pronouncing their names, but remain invisible to everybody but their master. Ganja Mara recognizes Thalib, and they stay in the garden until Ganja Mara has recovered his strength. When they depart, Kubaya accompanies them for a day and then goes to Nila Suba, who pardons him on the strength of Ganja Mara's letter and makes him chief of all the Jins in his district.

Ganja Mara with Thalib, who now receives the name of Janus, and his 10 companions wanders in the direction of Gangga Buana. At Gangga Buana Taj Salim has reached his sixteenth year, and the king asks Anta Dalus to look for a wife for him. After a discourse as to what bride and bridegroom expect to find in each other, Anta Dalus proposes the princess of Jangga Dupa, whose king is the younger brother of the queen of Gangga Buana. An ambassador is sent and returns with a favourable answer, and Taj Salim, whose coarse behaviour on this occasion shocks everybody, proceeds thither under the guidance of the ambassador, as the vizier has fallen ill and Taj Salim declines to wait for his recovery. The distance between the two countries is about twelve days' journey; at a distance of five days from Jangga Dupa, there is a watering place called Kētara, which is the resting place for all travellers, as there is no more water to be found on the way. Robbers infest the hills and often waylay travellers. When they hear of the prince's coming they drug the water and rob the party of everything. When getting away with their plunder through the woods, they are heard by the party of Ganja Mara, are attacked and defeated and have to leave their booty, which is examined by Ganja Mara and Janus. From the official letter they learn all about the caravan that has been robbed, and though Ganja Mara has no intention yet of getting married, Janus persuades him to wed princess Kēmalih in order to prevent his cousin from being married to the son of Johar Salim. Dressed in royal clothes they proceed to Jangga Dupa, buying horses on the way from caravans.

Taj Salim and his party return to Gangga Buana. Though the behaviour of Taj Salim again shocks everybody, and Anta Dalus suggests that the king should have patience, as God would bring everything to a good issue, at the request of Taj Salim preparations are made for a second journey.

Ganja Mara in the meantime reaches Jangga Dupa. At the court he and Janus win everybody's heart. The letter is read, and Ganja Mara is welcomed, though the king and his vizier are surprised that the prince is accompanied only by some youths and by no older officials. Janus says that the king of Gangga Buana had been unable to come owing to the illness of his vizier, but had sent the former ambassador and Johar Salim with a large party. He himself had met the prince on his return from Tanjong Maya, where he had been trading, and had found him in a very ill humour

as neither of his parents would be present at his marriage. The prince had therefore sent back the ambassador and the whole party, and with great difficulty Janus had been able to persuade him to deliver the letter and the presents. The prince, uneasy through prophecies that he would be separated from his parents, had forbidden the use of his royal title and had styled himself Ganja Mara. He had ordered Janus to inform the king of this and to ask leave to go away again for a couple of months. Janus, however, thinks that once he has gone none could tell whether and when he would return, and had persuaded the prince to stay. The king of Jangga Dupa and his vizier resolve not to wait, and a few days later Ganja Mara is married to princess Kēmalih. His modest demeanour and fine manners charm everybody and win him the friendship of Aman Shah, the younger brother of princess Kēmalih.

At Gangga Buana Taj Salim is doing his best to have the new party equipped quickly. Anta Dalus at last recovers from his illness and comes to court, where the king tells him the news and asks him to accompany the second party, to which he agrees. He insists, however, that the king of Jangga Dupa be at once informed of what has happened, and an ambassador is sent with a full report. At Jangga Dupa there is consternation when the letter is read, but the king is more afraid of his brother-in-law's wrath than actually sorry, as he has learned to love Ganja Mara. Great regret is expressed to the ambassador, and a letter is written saying that they had married the pretender in good faith and in obedience to the letter of the king of Gangga Buana, whose decision is asked as to what is to be done with Ganja Mara. Janus makes friends with one of the companions of the ambassador and tells him that he had met Thalib at Tanjong Maya, who had given him a ring for his father Anta Dalus and the message that he would soon return as God had sent him the sign he was waiting for. Both ring and message his new friend promises to deliver to Anta Dalus.

The ambassador returns to Gangga Buana, where his report causes great excitement. Taj Salim demands an army to annihilate Jangga Dupa; Anta Dalus thinks that his son has something to do with the affair. The king informs the queen, who is sorry at her brother being cheated in such a manner, and is afraid of the wrath of her husband and Taj Salim. Anta Dalus finds at home the ambassador's companion who brings him the ring and the message, and now understands everything. He goes to the prime-minister, who discusses with the other high officials what they are to do. Anta Dalus reminds him of the prophecy of Malim Dewana, and the prime-minister understands; asked, what advice they should give the king, Anta Dalus says that they can only follow the path of duty. When the matter is brought up in council the minister says that they were themselves not quite guiltless, as they should have reported the loss of the letter to the king of Jangga Dupa, who had acted in good faith and in accordance with that letter. Thus they should only mention the disappointment of Taj Salim

and leave everything else to Jangga Dupa. The king agrees, and a letter is written saying that the accident was God's will, that all the hopes of Taj Salim had been destroyed and that they are sorry that nothing can come of the union of the two families owing to this disgrace.

The king of Jangga Dupa, Shah Duli Shah, is satisfied, but his queen cannot get over the fact that a robber and thief has married her daughter. She sends a present to Taj Salim asking him to avenge the disgrace and tries to alienate the affections of her daughter from Ganja Mara, but princess Kēmalih, who has become pregnant, loves her husband deeply. The queen tries to have Ganja Mara murdered, but his sword protects him against all weapons, and the emerald against poison. Ganja Mara thinks that the king wants to kill him and asks Aman Shah to look after his sister if anything should happen to himself. He requests his wife if she should give birth to a boy to name him Badli Shah.

The queen gets some of the thieves who formerly robbed Taj Salim, and forces one of the maids to drug the evening meal of Ganja Mara and his wife. When both are unconscious, the queen leads the thieves into the palace; they carry Ganja Mara away to a boat, stealing the princess' betel-box, row out into the sea and throw Ganja Mara over board. The queen threatens with death anybody who betrays her secret. On the following morning the alarm is raised, but all search is vain. The queen accuses Ganja Mara of having crowned the disgrace of her daughter by stealing away, but Aman Shah and princess Kēmalih say that Ganja Mara has not disappeared of his own free will, as he had left his friends behind and his sword and quiver, from which he would never separate. Everybody, including the king, suspects the queen. Prince Aman Shah compels his father to give him troops to look for Ganja Mara; Janus will return to Tanjong Maya, and they will travel together until their ways separate. Princess Kēmalih would accompany her brother, but is persuaded to remain at Jangga Dupa until her child is born. She gives her husband's sword and quiver to Aman Shah and lets him know that her betel-box has disappeared at the same time. Janus' secret research has been in vain, but the night before their departure he overhears a youth who is to accompany Aman Shah taking leave of a maid of the palace; the girl tells her lover that the search would be in vain, as she heard the queen bribing the thieves to drug Ganja Mara and throw him into the sea. Aman Shah and Janus depart the next morning, following on the latter's advice the sea-shore.

Ganja Mara returns to consciousness when he is thrown into the sea; he sees the boat rowing off and thinks that the deed is done by order of the king. He finds a piece of driftwood and after several days is carried ashore at Pulau Hamba (Mamba). He wears the *kain* his mother had given him, and in it finds the ring of Kubaya. He calls Tamsun and Jamsir, who seek food and water for him, and help him to build a raft, on which, flying through the

air, they tow him to the mainland, which is only a day's journey distant. On their wanderings they find a town, burnt down and abandoned by its inhabitants. They meet a sick man, left behind by the fugitives, who tells Ganja Mara that the town has been destroyed by the troops of Ranga Duli, who coming from the North are sweeping down the coast and have gone south, carrying with them the wife and children of a king killed in the fight. Ganja Mara takes the road to the North.

Janus has accompanied prince Aman Shah along the coasts; he leaves the prince and with his ten companions sails to the islands on a boat hired from the "Orang laut". On Pulau Lēmba he finds enough traces of Ganja Mara to make out that Jins have been there and built a raft. He returns to the prince, but all search along the coast is vain, and they turn to the interior and wander from one country to the other enquiring for Ganja Mara.

In the North is a kingdom called Ranga Duli. The ruler, Maharaja Ganda Sin, is an idolater; there are temples for all the gods, and the biggest idol is of gold. The king is old, but childless; all vows to the gods have been useless. When hunting he meets a Brahman who carries medicine to cure his teacher at Bukit Linggam of childlessness. The king obtains some of the medicine but must promise to observe its *pantang*: those who partake of it must, when they are dead, be buried and not cremated as the custom of the country and its royal house demands; otherwise they will be denied heaven and will be reborn as base animals. In due course the queen gives birth to a daughter. At the time of the birth a thunderstorm rages, and many temples are destroyed by lightning. The queen dies in childbed. The Brahmans and sages prophesy that the child will be a mighty queen, as the power of her *dzulat*, has killed her mother, but the temples and wats must be rebuilt. The king agrees, but the queen is buried in spite of the protest of the Brahmans that only through cremation is immaculate rebirth possible, and posts covered with gold and silver (*tiang jandi = chandi*) are erected on the tomb. In quest of a nurse for the little princess a lady of the court comes to Tanta Guna, a former minister who had fallen into disgrace and retired into the woods. His wife, Dewi Angsali, has given birth to a daughter at the same time as the queen, but Tantaguna refuses to return to the town or to be separated from his wife. The king has him and his wife fetched in procession to the capital, gives him a palace next to his own, and Dewi Angsali becomes nurse to the little princess, who is called Jita (Jinat) Mala, whilst her own daughter is named Wang Gēkala. Tantaguna is reconciled to the king, who hands the government of the country over to him.

sages who daily come to the palace of the princess. The king is

The two girls are brought up together; in five years they know writing and reading and amuse themselves with *hikayat* and *shaer*. In ten years they study books of religion which the Brahmans explain and soon they are wiser than the 400 Brahmans and 400

pleased with his daughter's progress, and thinking of the prophecy sends an army to ask tribute and allegiance from the countries in the South and, if necessary, to subdue them by force. The army comes to Jangga Dupa; as prince Aman Shah with the greater part of the troops is away, the king has no choice but to pay tribute. The army proceeds to Gangga Buana; Shams Aalam consults Malim Dewana, who says that none can resist the honour and happiness that is now coming to the king from Rangga Duli; the king should not doubt but fulfil the enemy's demands. The king obeys the sage, and the conquering army continues on its way. At the same time the king of Gangga Buana hears from Jangga Dupa that Ganja Mara has disappeared and that prince Aman Shah has gone in search of him. Anta Dalus wonders what has become of Kêta Buana and Thalib.

Ganja Mara reaches Rangga Duli and stays with an old dyer, Nenek Kêbali, and his wife Nenek Kêbadi. King Ganda Sin dies when his daughter is thirteen years old. Under the guidance of Tantaguna princess Jita Mala succeeds her father with the title of Sêri Maharaja Putêri; in the audience-hall she sits behind a tenfold veil. Wang Gêmala rules her court. They still delight in puzzling the Brahmans and sages and have proposed ten questions, the first of which is: which is the biggest thing in the world? None can give the answer, for which the price of a town is promised.

A month's journey from Rangga Duli there is a kingdom of fire-worshippers (magicians, *majusi*), Jangga Lawi. Its king is Gênta Bumi, 24 years old; he has two brothers, Gênta Aalam, a wise youth, who is in charge of the government, and Gênta Lokam, who is his brother's general. All three are unmarried. The throne in the king's audience-hall has the shape of lion with open mouth, and the king sits on the lion's tongue. Through a merchant from Rangga Duli Gênta Bumi has heard of the death of Maharaja Ganda Sin and of princess Jita Mala; and he sends an ambassador proposing the union of the two kingdoms by marriage. The princess replies that she will marry the man who can answer the ten questions, which she sends to him. Wang Gêmala asks her what she would do, if an ugly coolie answered the questions, and the princess replies that then Wang Gêmala would take her place. The ambassador returns and Gênta Bumi gives the ten questions to Gênta Aalam, but he and all the sages of the kingdom are unable to answer even the first.

Ganja Mara has learned dyeing and his wares are sold by Nenek Kêbadi in the princess' palace. The princess dreams that an old man gives her a jewel, whose splendour penetrates all wrappings wherein she tries to hide it. Wang Gêmala dreams at the same time that the princess gives her an emerald-ring; she puts it on her finger and is just going to look at it, when she is awakened by the princess who tells her of her own dream. The sages prophesy great luck to both. Ganja Mara has converted the old dyer and his wife to Islam by convincing them of the

foolishness of adoring idols. He dyes a cloth for Wang Gēmala, and Nenek Kēbadi, who is always chaffed in the palace, begins to talk of her handsome and wise grandson Ganja Mara, but she does not know the meaning of the name. The princess gives her a cloth to dye, which Ganja Mara, when it is ready, sends back wrapped in the cloth his mother had given him. The princess marvels, and Nenek Kēbadi is sent to ask the proper price for such work; Ganja Mara replies that a great prince should know that. Wang Gēmala asks whether Ganja Mara would be able to answer the ten questions; Nenek Kēbadi does not know and is sent back with fifty rupees. Two days later two maids of the court are sent to the house of the dyer to ask what Ganja Mara's name means, and whether he would be able to answer the ten questions. Ganja Mara replies that a mighty princess should know the meaning of his name; the questions he thinks he would be able to answer. The maids are so amazed at his beauty that they make obeisance (*sēmbah*) which he declines as it would bring the sacred course upon him (*tulah papa*). But when they report to the princess and Wang Gēmala, the latter says that Ganja Mara must be the jewel the princess has dreamt of. When Nenek Kēbadi comes again to the palace, the princess gives her back the cloth which Ganja Mara has dyed, and which Wang Gēmala had torn and marked, saying that it was spoilt. Ganja Mara understands; by Kubaya's ring he calls Tamsun and Jamsir, who mend it so that no trace of the tearing is left, and Ganja Mara marks it with his own name before he returns it to the princess. A few days later he sends Jamsir, who assumes the shape of Nenek Kēbadi, to the princess to offer her his emerald-ring for sale, but without naming any price, which the princess should know herself. Wang Gēmala estimates the price at that of a kingdom, and the princess sends Ganja Mara the message that she could not pay that price, but if he would answer her ten questions, she would buy the ring. Ganja Mara replies that she should take the ring as a present, as none would care to buy it at that price. Wang Gēmala persuades the princess to accept the ring, which she could make good to Ganja Mara later and sends him two trays with perfumery and food. It is arranged that he shall come to the palace to answer the questions, but without making the *sēmbah* to the princess, and with only four Brahmans and sages present. Tamsun and Jamsir accompany him, and only two of the sages are able to see the two Jins. Ganja Mara, takes a seat before the throne with the ten veils, pretending not to know that the princess is behind them. He answers the first question that the biggest thing in the world is the mind (*angan-angan*), and everybody agrees. Upon a sign from Ganja Mara Jamsir and Tamsun let down the first veil of the throne. The sages marvel, but the princess and Wang Gēmala know that it is Ganja Mara's work. To the second question Ganja Mara answers that the smallest thing in the creation is this temporal world, which is the meanest thing to those who have true knowledge. Another veil

drops, and altogether eight questions are answered (no further details given here), and eight veils have dropped, so that Ganja Mara and the princess can see each other. Wang Gēmala says the remaining two questions should be answered on the following day. Both parties retire; the princess is silent and pays no attention to Wang Gēmala's chaffing. They both sleep badly, as Wang Gēmala sees what is coming but doubts her own lot, being afraid that the princess will give her to Ganja Mara as a *gundek*. The following morning she sends, with the consent of her mistress, a message to Ganja Mara that the princess had not slept being curious to know the answer to the remaining two questions. Ganja Mara replies that having answered eight questions it would be right that he should present his answers to the last ones. Wang Gēmala orders the palace to be prepared, as there would be a guest that night, which the princess doubts, but Wang Gēmala asserts that so far she has always been right, and she herself adorns the state-bed. At night-time the princess sits down on the couch and reads to Wang Gēmala the story of Alexander the Great, but is much excited. Tamsun and Jamsir take Ganja Mara's hands, and, thus being made invisible, he enters the palace, where Ganja Mara sits outside of the curtains, whilst Tamsun and Jamsir assume the shapes of the old dyer and his wife. Ganja Mara becomes visible, and he and the princess, who is separated from him by the veils only, look at each other as in a trance, and all chaffing of Wang Gēmala and the old couple to make them talk is of no avail. At last Ganja Mara recovers his senses and raises the curtains; the princess runs away, but Ganja Mara catches her in his arms and deaf to entreaties and promises carries her to the bed of state, saying that he had never seen a piece of sugar-cane, which an elephant had put into its mouth, come out again.

Wang Gēmala chaffs the old couple, who make so much fun that the general laughter causes the young people to appear again. A meal is served, the old couple are sent away, and Ganja Mara remains three days with the princess, whom Wang Gēmala excuses to Tantaguna as being sick. When Ganja Mara wants to depart, the princess will not let him go, and he follows her to the veiled throne in the hall of audience. Here he observes how well Wang Gēmala manages everything, and thinks what a good match she would make for Janus. The thought of his friend and his fate makes him sad, and the princess and Wang Gēmala are troubled. With the help of the Jins Ganja Mara leaves the palace and tells the old couple to look out for Janus and invite him to their house if they should find him. Returned to the palace, he still behaves strangely, and always looks hard at Wang Gēmala. In vain the princess tries to find out who he is; he only says that he comes from Pulau Kubin, and that his name is Nila Suba. The princess is disturbed and does not speak to him for a night and a day, but at last they become friends again. Ganja Mara wanders through the palace and finds in a locked room the idol to which the princess

prays. He orders Jamsir to await the princess, to talk to her invisibly, making idolatory ridiculous, and to tell her his real name and story. He returns to the house of the dyer. In the audience-hall two princes of the South appear to answer the questions and fail at the first one. Tantaguna has heard of Ganja Mara's having answered eight questions, and that he has entered the palace. He doubles the guards, but nothing being discovered, he sends for his daughter. Wang Gēmala tells him all and the old minister is uneasy, as he knows that Pulau Kubin is uninhabited, and Nila Suba is no human name. Wang Gēmala returns to the palace, and prays and makes offerings with the princess before the idol. Jamsir makes the idol move its head and says that all idolatry is vain. Her husband would lead the princess and the world on the right path, on which the parents of the princess had done the first step. Does she not know that her husband is the son of Sultan Shams Aalam of Gangga Buana of the house of Alexander the Great? He narrates the history of Ganja Mara; the princess is glad, and when Ganja Mara returns, she chaffs him, and, though he pretends not to understand, she asks him about his former marriage, and they enter upon a merry discussion on polygamy. Ganja Mara asks about the locked room; she does not want him to know, but Jamsir opens the door, makes the idol jump about and come to Ganja Mara, asking forgiveness for the deceit it has practised so far, which shall end that day, and then he makes it jump into a cess-pool. The princess and Wang Gēmala are converted to Islam, and Ganja Mara returns to the house of the dyer. Wang Gēmala has all idols in the palace taken away.

At the dyer's house Ganja Mara meets the eight sages. In the pocket of one of them Jamsir finds a small idol and makes it ask the forgiveness of Ganja Mara, who then burns it and converts the sages to the true faith.

Returned to the palace Ganja Mara behaves as if he has intentions on Wang Gēmala, but in the night tells the princess his real design and asks her to abolish idolatry and convert her subjects. She should have all the unmarried princesses of the subdued countries brought to her capital, which would bring his sisters to Ranga Duli: if a suitor came for any of the princesses, she should be allowed to return. The princess sends Wang Gēmala for Tantaguna, telling her that she wants to give Wang Gēmala as a *gundek* to Ganja Mara, and though Wang Gēmala does not quite believe her, she is very uneasy. But to her relief the princess discusses with Tantaguna only her plan of inviting the princesses of the subdued countries, and later Tantaguna is asked to send ambassadors to those countries, announcing that princess Jita Mala has ascended the throne of Ranga Duli and invites all unmarried princesses to her court, promising that they shall only be the play-mates of the queen, that they will not be made maids and will be allowed to go home as soon as they are asked in marriage. The highest officials are sent to Jangga Dupa and Gangga Buana. The commander of

the army which accompanies the ambassadors is ordered not to do harm anywhere, but a second army is sent a few days later in case of emergency.

Ganja Mara stays during day-time at the house of the old dyer and at night returns to the palace. Tantaguna, passing the house of the dyer, leaves a message inviting Ganja Mara to his own house, where a feast is prepared for him, which he bids his daughter also attend. The princess chaffs her that she is to be engaged to Ganja Mara. Tantaguna receives Ganja Mara with great respect, and though Ganja Mara pretends to be a merchant from Pulau Kubin, he perceives that Tantaguna has been told all. He converts Tantaguna and his family to Islam.

Janus and prince Aman Shah have searched in vain for Ganja Mara but Janus is unable to believe that he is dead, as according to the prophecies of Malim Dewana he has still great deeds to perform. Under the promise of secrecy he discloses Ganja Mara's and his own parentage. They separate, the prince to return to Jangga Dupa to search anew if he hears no news of Ganja Mara there, and Janus to search further north but to return to Jangga Dupa within five months. Janus takes the quiver and the sword of Ganja Mara with him. The prince hears that his country and Gangga Buana have been compelled to pay tribute to Rangga Duli, and that a second army is coming to fetch away the princesses. His sister has given birth to a boy, Badli Shah. When the new army of Rangga Duli approaches, Shah Duli Shah decides to proceed to Gangga Buana with his whole family. They are received cordially, and Shams Aalam proposes that Taj Salim shall marry princess Kēmalih, as her husband is probably dead. Shah Duli Shah is compelled to agree, though he does not like Taj Salim, who disgusts him with his coarse behaviour, and he longs for the return of Ganja Mara. The festivities for the marriage are about to begin, when the approach of the new army of Rangga Duli is reported:—it had made only a short stay at Jangga Dupa when the royal family was found to be gone. Everything is prepared for the defence, but Anta Dalus advises to hear the ambassador first as to the new army's wants. The ambassador sends an officer with the letter; Shams Aalam replies that he is just going to marry his son to the princess of Jangga Dupa, but the officer advises him to wait until he has seen the ambassador. The king agrees, the officer returns, but during the night the army of Rangga Duli surrounds the town and the second army also arrives. On the following day Shams Aalam holds a council of war, attended by Shah Duli Shah, who has just received the news that prince Aman Shah has been captured by the army of Rangga Duli, but is treated honourably. Anta Dalus is present and on his advice Malim Dewana is called. The *jakir* says that the army is bringing luck, that the days of sorrow are almost over, and happiness is coming. Badli Shah comes into the room; Malim Dewana takes him in his arms and

calls him the crown of Gangga Buana, which would not remain in Jangga Dupa but return to Gangga Buana. Taj Salim is wild because the *jakir* prophesies the kingship to the son of a robber but Malim Dewana heeds him not and advises the king to bring his children to Rangga Duli where happiness was in store for him. Janus had separated from Aman Shah, the prince being now with the army of Rangga Duli, but he was being well treated and would soon be brought to him. The ambassador arrives with prince Aman Shah. He promises that the princesses shall be kept at Rangga Duli as in their own country and he appeases the fears of the kings. They promise to bring their children to Rangga Duli. The ambassador is feasted on fruits, as they do not know he is accustomed to eat rice. He reports by letter to his queen, who bids Tantaguna build lodgings for the guests.

The royal families depart in great state and with many troops in order to make a greater impression at Rangga Duli. During the journey Aman Shah rides near his mother and sister and frustrates all attempts of Taj Salim to approach princess Kēmalih.

At Rangga Duli Tamsun and Jamsir ask Ganja Mara that one of them may be permitted to visit their parents, and Tamsun receives five days leave. On his way through the air he sees Janus with his friends sitting at the foot of the hills looking disheartened. He draws pictures of Ganja Mara, showing the four marks, on *b'dura*-leaves, which he drops and thus arouses Janus' attention. With other leaves he leads him on to Rangga Duli. There Janus hears that the royal families of Gangga Buana and Jangga Dupa are expected. He stays at night in the big temple, now deserted by worshippers, and the old caretaker abuses the man who has alienated the people from the old gods. Janus asks his name, but the caretaker can only give him the address and description, and Janus thinks that it must be Ganja Mara. During the night the old caretaker dies; Janus takes away the biggest idol, buries it and leaves a letter, saying that the idol had departed owing to its being neglected, and that the other idols should follow it.

Tamsun reports to Ganja Mara, and soon the two friends meet and relate their adventures. Ganja Mara is glad to have his weapons back. In the city there is consternation at the disappearance of the idol of Kēsta Pati (later Kēsana Pali). Ganja Mara writes to the princess that the time for abolishing idolatry has come; the other idols should be invoked to bring the lost one back, and if they are unable to do so, that will show that they are useless. When the Brahmans report what has happened, the princess orders as Ganja Mara has advised, adding that if the idols prove useless, they shall be thrown into the sea and the temples pulled down. The Brahmans are afraid, and their disciples search everywhere for the lost idol.

Ganja Mara goes to the palace, where the princess awaits him. He seizes Wang Gēmala's hand and puts a ring on her finger which the princess had given him, saying that it is a sign that he will

accept the princess' bounty and not change his mind. Wang Gēmala is in distress, but is afraid to show it as the princess seems satisfied with Ganja Mara's doings. During the night Ganja Mara tells the princess that Janus has arrived, and on the next day Tamshun brings Janus unseen to the palace. He falls in love with Wang Gēmala, and through his modest behaviour wins the favour of the princess.

The Jins bring Ganja Mara and Janus safely back to the house of the dyer. They pay a visit to Tantaguna, who has heard of Anta Dalus, and is now able to check the story of Ganja Mara which his daughter had told him. He comes to love Janus as his own son, and when the princess tells him Ganja Mara wants Janus to marry Wang Gēmala, Tantaguna consents, but Janus refuses to marry until Ganja Mara's marriage is celebrated. He is made Bēntara but has to wear Hindu-dress.

The royal guests arrive and are received by Tantaguna, who conveys Sēri Maharaja Putēri's message that they should rest a few days before they meet her. Janus finds his former friend from Jangga Dupa, and under the *pretext* that he would have to send a report to the king of Tanjong Maya obtains from him a description of every notable guest, which Janus writes down. After a few days Sēri Maharaja Putēri invites the princesses to her palace. Their mothers and prince Badli Shah accompany them. Princess Sēri Maharaja Putēri receives them in the big gallery (*sērambi*); she makes the *sēmbah* to the two queens, though both are frightened and will not accept it, and she herself declines to accept the *sēmbah* of princess Kēmaliḥ, as the latter is the elder. She wins the hearts of her guests by telling them of her motherless childhood and her loneliness, which is the reason for her having invited them to become her play-mates. She does not let her guests feel that they belong to subdued countries and treats the queens as she would her mother. She is not clothed in royal garments but wears the old *kain* of the queen of Gangga Buana and her emerald-ring, which Ganja Mara had given her. She is told the story of princess Kēmaliḥ and says that Ganja Mara must be dead in consequence of his presumption (*mati tulah*) and that princess Kēmaliḥ should look elsewhere for consolation. The queen of Gangga Buana tells her of the intended marriage with Taj Salim, and Sēri Maharaja Putēri suggests that the marriage could be celebrated now, but Wang Gēmala opines that it would not be proper to marry a widow to a youth who had not been married before; a widow should marry a widower, and a virgin an unmarried youth. Princess Kēmaliḥ, alarmed, declines all proposals. The queen of Gangga Buana observes the *kain* and the ring, but says nothing, being afraid that they resemble her former property as two mousedeer resemble each other. Ganja Mara observes the scene from behind a curtain and feels pity for his mother. When Siti Sēliḥ arrives with presents from the kings, Ganja Mara has an opportunity to ask Sēri Maharaja Putēri to bring him his son, which she manages under the

pretext of giving the child grapes. Ganja Mara takes his son into his arms; Badli Shah begins to cry, but is consoled with fruits; and when he is taken away he tells his mother that he was afraid of a man hidden there. Sēri Maharaja Putēri explains that a picture of her father is hanging in the other room. When the meal is served, Sēri Maharaja Putēri compels Princess Kēmalih to eat with her, as she should overcome her prejudice against sharing a meal with one not of her faith, and invites her to stay with her in her palace. Her mother broaches again the subject of the intended marriage with Taj Salim, and Siti Sēlih seconds her, but as princess Kēmalih has declined, Sēri Maharaja Putēri will not suffer her to be forced. The guests are given presents and depart; princess Kēmalih is lodged in a separate part of the palace and does not see Ganja Mara, who stays with the princess but returns to the dyer's house on the following morning.

Sēri Maharaja Putēri visits princess Kēmalih, to whom Badli Shah had been brought, and they talk about her former marriage and Taj Salim, whom princess Kēmalih compares to a buffalo, and whose coarseness she cannot understand as such great things have been prophesied of him. Princess Kēmalih thinks that Sēri Maharaja Putēri wants Taj Salim for herself, and has that idea conveyed to her parents by Siti Sēlih, who had been sent to persuade her to marry Taj Salim. The kings and queens are surprised, but remember Malim Dewana's prophecies and the queens are asked to sound Sēri Maharaja Putēri on their next visit to her. But Sēri Maharaja Putēri, evades all questions and only suggests that the marriage of princess Kēmalih and Taj Salim should be delayed for a year or two, to find whether they could obtain news of Ganja Mara. As the queen of Gangga Buana keeps looking at the *kain* and the ring, Sēri Maharaja Putēri narrates that they had been given to her father by fishermen who had found them on the dead body of a boy on the sea-shore. The queen recognises her former property and cries. When the queens return to their husbands, they think that Sēri Maharaja Putēri wants to marry Taj Salim, who is bathed and adorned with finery by Siti Sēlih, her sister and Johar Salim, and already thinks himself the consort of Sēri Maharaja Putēri. The queen of Gangga Buana tells her husband that apparently robbers have killed the little Kēta Buana. The two princesses of Gangga Buana remain with Sēri Maharaja Putēri.

The king of Gangga Buana discusses Taj Salim's marriage with Anta Dalus; Anta Dalus is silent, as he does not believe that Malim Dewana meant Taj Salim. Tantaguna is asked to obtain an audience for the kings, who are anxious to return to their countries.

At night the two princesses of Gangga Buana have to share their meal with Sēri Maharaja Putēri, and Ganja Mara joins them without being introduced to his sisters, who of course do not recognize him. Sēri Maharaja Putēri pretends that she will give one of them to Ganja Mara as a *gundek*, bidding him embrace and kiss them, which he does, whispering to them to obey the whims of the queen

in order not to endanger their parents, to whom he will restore them later. The princess says that they shall have rooms right and left of her own, and Ganja Mara must have patience, as the palace is not yet guarded against an attacks by their parents. So they are suffered to return to princess Kēmalih, who does not know what to think of Sēri Maharaja Putēri. The next evening the same play is repeated, and the poor princesses are very glad to return to princess Kēmalih, who is still more perplexed.

On the following morning the kings are brought to the audience-hall by Tantaguna. Janus arranges everything with the help of the notes he had taken; the kings receive seats to the right and left and are told that Sēri Maharaja Putēri will not suffer them to make obeisance as they are older than she; Prince Aman Shah is free to make the *sēmbah* or not. Aman Shah thinks he recognises in the Bēntara his friend Janus, but the Hindu-drees confuses him. Anta Dalus wonders in silence.

Taj Salim, covered with jewels like an idol, has separated himself from the royal procession in order to get a reception of his own, but nobody notices him when he arrives, and he has to sit down with Johar Salim amongst the Biduandas. The kings are surprised that the Bēntara, who knows his task so well, suffers Taj Salim to sit among lower officials, but they are too embarrassed to say anything: Aman Shah and Anta Dalus wonder if the Bēntara is a clairvoyant Brahman, who has found out that Taj Salim is the son of a Biduana. Johar Salim reminds the Bēntara of Taj Salim's position, but is reproved and told not to meddle. If a king brings up the son of one of his servants, the audience-hall is not a place for that child to play in, and it should not be brought into the audience on such an occasion; Johar Salim had better return to his place and keep his peace. Everybody is amazed, and the king of Gangga Buana asks the Bēntara why his son has been banished to such a low place. The Bēntara kneels before him and replies that he had been placed in charge of the hall and instructed to look after the royal guests. He deserved death if he had neglected to look after a son of the king, but he did not see the prince in the hall. If any other person came, adorned even with the sun and the moon, he would not suffer him to disgrace the guests by allowing rubbish to mix with jewels. So far as he knew Taj Salim had his proper place; if he were wrong, he was ready to receive punishment. Sēri Maharaja Putēri appears on the throne with Wang Gēmala and the ladies of the court; five of the veils are let down, and through the remaining five her figure is just to be seen. Seven times homage is paid to her; Prince Aman Shah also pays homage while the two kings bow to her with crossed arms. She welcomes the kings and asks them to take over the government of Rangka Duli during their visit, which she trusts will be long. The kings accept, but beg to be allowed to return as soon as possible to their kingdoms, the flourishing or decline of which would reflect on Her Majesty's glory. Sēri Maharaja Putēri is pleased and sends them two crowns

as a present. Presidents are given to all the guests, Taj Salim receiving the same as the Biduandas. A meal is served, for which Sēri Maharaja Putēri asks her guests to set aside all race-prejudice, as all races were created by God (*Allah*). Tantaguna is bidden to acquaint the kings with the affairs of state, he mentions to Sēri Maharaja Putēri the incident of Taj Salim and that the Bēntara awaited her judgment. Sēri Maharaja Putēri replies that the case requires investigation, and she requests the kings to have patience until the next audience; if the Bēntara had committed a fault, he and his family should be put to death.

After the audience the kings and their ministers discuss the matter in their own palace. All agree that the Bēntara, though unknown to all of them, had shown an astonishing knowledge of the guests, had brought over some poorly dressed relations of the royal house from their place amongst the lower court-officials to the royal seats, and had sent a richly dressed son of a wealthy merchant from the place he had chosen amongst the young noblemen down to the lower ranks. There must be something behind the affair, and the behaviour of Sēri Maharaja Putēri confirmed that. Aman Shah remembers a word that is written in his heart, and, pressed by his father, relates how at Gangga Buana the *fakir* Malim Dewana had prophesied that Badli Shah would reign over Gangga Buana, and when reprimanded by Taj Salim had replied that greatness and joy would return to where they belonged, but that the time had not yet come. He connected those words with what had happened that day, and they should help to clear up the case. All agree, especially Anta Dalus, who sees that his head has not been wrong against his heart.

Sēri Maharaja Putēri returns to princess Kēmalih and tells her that she had been right in wanting to have nothing to do with Taj Salim, who had met with disdainful treatment in the audience, though she had not yet investigated the cause. Princess Kēmalih should be patient, and in the meantime Sēri Maharaja Putēri will have a search made for Ganja Mara in the coast-countries subject to her; what would be the reward if she found him? Princess Kēmalih declares that in that case she and her son, probably also Ganja Mara himself, would become her servants. The two princesses of Gangga Buana are called to witness the agreement, and they and prince Badli Shah are taken by Sēri Maharaja Putēri to her part of the palace, where Ganja Mara awaits them. By threatening that, unless they obey, all friendship with them shall be finished and their parents and country suffer, Sēri Maharaja Putēri rather cruelly compels them again to let Ganja Mara embrace them, and when they return to princess Kēmalih, they resolve to inform their mother and to find means to leave the palace. Jandus advises Ganja Mara not to go too far in teasing his sisters. In the palace the queen of Gangga Buana receives permission to take her daughters with her to visit their father, but princess Kēmalih is not allowed to go until the others

return. The queen of Gangga Buana bids her daughters, who have told her everything, not to mention their troubles to their father. The king is still discussing the case of Taj Salim with his ministers and Anta Dalus, who advises him to examine the female attendants who were present at the birth of the prince. The king, preoccupied, greets his daughters, but does not pay much attention to their words. He examines the ladies of the court, but can discover nothing, and broken-hearted throws himself down on his couch. But fear has seized the maids, and three of them decide to tell the king all they know as soon as he awakes. In the afternoon the king visits the queen, and she cautiously tells him what her daughters have reported, that a man is hidden in the palace, and of his behaviour towards her daughters. The king is thunderstruck, as he cannot reconcile the doings of Sēri Maharaja Putēri with her kind words. On his way to the audience-hall, the three ladies of the court meet him and tell of their experience on the third day after the birth of the prince, how they became unconscious, apparently owing to some drug, how when they returned to consciousness the voice of the little prince seemed to have changed, and how Siti Sēlih had behaved. The king bids them keep silence for the present and goes to meet Anta Dalus and his ministers. He first tells them of what his daughters had experienced in the palace; they are shocked, but think that there must be something behind it, as Sēri Maharaja Putēri is too noble to stoop to anything low. Tantaguna appears with the nobles of the court, and the official audience of Rangga Duli is held by the two kings at the request of Sēri Maharaja Putēri. Two princes of Sēntali come to try their luck with the ten questions, and a day is appointed for the trial. After the audience the two kings with prince Aman Shah hold a council on the happenings in the palace, but decide that they must do nothing that would disturb their friendly relations with Sēri Maharaja Putēri as long as they are entrusted by her with the affairs of her state. As regards Taj Salim, they will investigate further. The king of Gangga Buana returns to his queen, and they call Siti Sēlih but she denies everything. The king in despair calls Anta Dalus and implores him to help him. Anta Dalus, having received permission to speak candidly, reminds the king of the prophecies of Malim Dewana, of the three marks, to which a fourth would be added later; and he relates the suspicions which had influenced him in giving names to the children. Originally he had intended to inform the king, but Malim Dewana had declined to disclose anything and on mere suspicion he had been unwilling to anticipate the will of God. Siti Sēlih and eleven of her friends are summoned; Siti Sēlih excuses herself on account of illness and despatches a friend to her sister Siti Khalilah to say that their game has been discovered. But the messenger is intercepted. Threatened with death on the stake the friends of Siti Sēlih confess. Siti Sēlih denies everything; Johar Salim and his wife are sent for, but have fled. The king swoons; when he awakes Anta

Dalus consoles him that he will soon see his son but the king tells him that he must be dead, as his queen had seen the ring and the *kain* in the possession of Sēri Maharaja Putēri. Anta Dalus still believes in Malim Dewana's prophecies. Prince Aman Shah is called; he does not understand the meaning of the boy's body of which Sēri Maharaja Putēri had told the queen, but he knows that Ganja Mara is Kēta Buana. He takes charge of the investigation, and Johar Salim having fled, his friends are examined and the man who has brought the boy to Pulau Kubin is discovered. Aman Shah narrates how he found Janus, who owns to being the son of Anta Dalus, on his search after Ganja Mara, and that Janus also knew that Ganja Mara was identical with Kēta Buana. The king of Jangga Dupa is called and told that Ganja Mara was prince of Gangga Buana. They all agree to be patient and rely on the words of Malim Dewana, and Aman Shah relates that Janus had found traces of a raft on one of the islands, and how they had separated to meet again after some months at Jangga Dupa. Everybody is getting more hopeful, and Anta Dalus advises that an eye be kept on Sēri Maharaja Putēri, who is sure to know more, and to find out what the man who is hidden in the palace looks like. The kings agree, and the queen of Gangga Buana is told to give a hint to her daughters and princess Kēmalih. The culprits are looked up.

On the following morning Sēri Maharaja Putēri sends ladies of the court to fetch the two princesses of Gangga Buana, who have again a hard time, being pressed by Sēri Maharaja Putēri to promise that they will obey Ganja Mara in all things. They apply to her for protection, but Sēri Maharaja Putēri replies that what pleases Ganja Mara also pleases her, and tells several stories how true friends and true lovers feel exactly the same. She threatens to give them a love-philtre she had obtained from a Brahman of the mountains, which would make them the slaves of the will of Ganja Mara, or another one, which would make them mad, as she was not accustomed to have her will opposed. As the princesses remain obstinate, Sēri Maharaja Putēri feigns anger and sends them back to princess Kēmalih, who informs her parents by letter of what has taken place. The kings and queens are uneasy, but are persuaded by Aman Shah and Anta Dalus that Sēri Maharaja Putēri would do no wrong.

Maharaja Gēnta Bumi at Jangga Lawi can obtain no reply to the ten questions of Sēri Maharaja Putēri from his brother and his sages and resolves to enforce a decision. He sends one of his ministers, Mēntēri Sēntia, with an enormous army to Rangga Duli with a letter of his grandvizier and his ministers to the grandvizier and ministers of Rangga Duli, and with the order to storm the town and to capture Sēri Maharaja Putēri if she declines to become his wife. When the rumour reaches Rangga Duli, Sēri Maharaja Putēri declares that she would accept the suitor only if he solves her questions; otherwise the kings, to whom she had

entrusted the affairs of state, would know what there is to be done, being better versed in matters of war than herself. Měntěri Sěntia with forty warriors is admitted to the audience, and the letter is read, telling the grandvizier and ministers of Rangga Duli that the king of Jangga Lawi had received the letter and the questions, but that they had to do with a real world and not with woman's whims; if they can persuade their queen to accept the king's suit, it will be in the interest of their country; if they prefer to follow a woman's whim, everybody will have to act as he considers best. Tantaguna requests the king of Gangga Buana to give his decision, and he replies that certainly it will not be wise to follow a woman's whims, but it will also not be right to use force against a mighty queen who will only be an unwilling party to the quarrel. Not to obey her command would be treason, and he as a guest cannot but abide by her will that she would not obey Maharaja Gěnta Bumi unless he was able to answer the ten questions; the ambassador should persuade his king to obey the wish of Sěri Maharaja Putěri, which would only increase his glory. The ambassador angrily replies that in that case they had better prepare for war, as he would not return without having attained his purpose, and leaves the audience without doing obeisance. Later, he sends a letter acknowledging that it would be wrong to attack the country which is in the right, but that he has to obey his king. The king of Gangga Buana, replies that he understands the ambassador's position and shall not blame him for what is to come.

The troops of Rangga Duli, Gangga Buana and Jangga Dupa are called to arms, and Janus asks for the command of the auxiliaries from Chinta Balai, who are only five hundred mighty fighters, and the prince of Chinta Balei is advised to keep his champions at home, ready to attack the enemy in the rear.

Sěntia has split his army into three parts who are to surround the town; they are met by the three armies of Rangga Duli, who however do not answer the wardrums of Sěntia and fight only to frustrate the enemy's design. Sěntia sees that they will restrict themselves to the defensive and that he will have to attack the people who have done no wrong in order to gain a decision. He sends a written report to his king and on the following morning orders an attack against the troops of Rangga Duli, who during the night have thrown up entrenchments. The leader of the attack is Jani, the champion of Jangga Lawi, and the troops of Rangga Duli suffer great loss through him for ten days. Janus and Anta Dalus bring the auxiliaries from Chinta Balai into action, and Ganja Mara accompanies Janus and his ten friends, to return as a warrior from Chinta Balai, and if successful in the fight, to solve the ten questions of Sěri Maharaja Putěri in public. He returns with the warriors of Chinta Balai, and attacks Sěntia's camp, takes and burns it. Sěntia has now to fight against two fronts, as the troops of Rangga Duli attack in their turn; the two other armies leave their entrenchments and Sěntia is surrounded from all sides. Ganja Mara

meets Jani, drags him from his horse, snatches his weapons and tells him to cease fighting. Jani feels his strength vanishing, and Ganja Mara tells him that he has faithfully served his master but should now return vanquished and kill no more in this fight. He then releases him, and Jani, surprised, asks his name. Ganja Mara tells him that he is called Buna (Buana?) and is a warrior from Chinta Balai. Jani returns to Sëntia, who is in great distress, tells him what has happened and that he will fight no more in this war. He advises Sëntia to stop the battle, and Sëntia gives the sign to return, but the camp being destroyed, the army has no base to retreat upon and is pressed back to the foot of the hills. When night comes, the armies of Rangga Duli return to their town with great booty. The warriors of Chinta Balai stay the night in the burned camp.

The kings, who have watched the battle from the walls, return in joy to the palace and give order that the losses be ascertained, that the wounded receive medical aid, that widows and orphans are provided for, and that the sons of the dead are as far as possible appointed to the posts of their fathers. Princes and officers receive presents. On the following morning the prince of Chinta Balai comes to the audience with his warriors and receives rich presents. After the audience he visits Tantaguna and praises Ganja Mara and Janus to him; Tantaguna lets him into the secret and recommends the two to his care.

A few days later the great audience takes place where the princes of Sëntali shall be given an opportunity to solve the ten questions. Eight hundred Brahmans and sages are present, and Sëri Maharaja Putëri takes her seat on the throne behind the tenfold veil; the drums announce her presence. First political affairs are discussed. The king of Gangga Buana thinks that the king of Jangga Lawi will not accept the defeat, and it is decided to call up the armies of all countries subject to Rangga Duli. Tantaguna then mentions the two princes of Sëntali, and the prince of Chinta Balai says that his nephew, whom he had adopted, being childless, was very anxious to hear the ten questions, in spite of all his dissuading. The princes and Ganja Mara are sent for; in the meantime Sëri Maharaja Putëri asks about the big idol which should be fetched back by the lesser ones. Tantaguna replies that everything is done as ordered by her, but without success, and Sëri Maharaja Putëri gives the Brahmans a few days' grace for a last effort. The princes of Sëntali and Ganja Mara appear, the latter in Hindu-dress, which makes it difficult even for Janus to recognise him and confuses Aman Shah, who had intended to address him as Ganja Mara. To the first question the two princes reply that the biggest thing in the world is injustice, which darkens everything, and the audience feels inclined to agree. As the smallest thing in the world they name the mote in the sunbeam, but admit that even this is tangible and therefore can still be divided, and the sages decide that the answer is not satisfactory. At the third and fourth question the princes

fail, and Ganja Mara is asked whether he can give an answer. He replies that he had not come to answer the questions but merely to hear them, but if it would not be taken ill he would tell them just what he is thinking. The biggest thing in the world is the mind, the smallest thing this temporal world, the remotest thing a deed just done, as nobody can approach it again, the nearest thing is death. The easiest thing is to wish to refrain from everything the Lord has forbidden us to do, and the most difficult thing to perform all the Lord bids us to do. At each answer one of the veils drops down, and the kings consult uneasily with Anta Dalus, but he thinks that Tantaguna will know what to do. Ganja Mara says that the widest thing in the world is the human heart which believes in God's omnipotence, as it encompasses all His might. To the next question Ganja Mara hesitates to reply, as he is afraid to wound the feelings of the audience, but, being pardoned in advance, he says that the narrowest thing in the world is the heart of a human being who does not believe in God who created him and the whole world, but instead of Him worships something that has no power at all. The Brahmans and sages fall at his feet and promise to renounce earth, stone and timber for the true God, praising the wisdom of Ganja Mara, who declines their praise as only their questions had produced the truth in his heart. Sēri Maharaja Putēri will accept the answer if Brahmans and sages will adjure false doctrine and teach the truth. This they do, and the eighth veil drops. The last two questions ask what the beginning and the end of this world are, but Tantaguna interferes, as he does not want Sēri Maharaja Putēri exposed to the eyes of the audience. He says the answers to these questions would reveal the knowledge of the Lord who created everything before the high and the low, and the law and custom (*hukum dan 'adat*) of all lying between beginning and end would no longer be veiled. He cannot consent to have these questions asked publicly; whoever wanted to fathom them has received sufficient truth in the first eight answers to find the answer to the last two questions. The kings agree; Sēri Maharaja Putēri declares that her questions are answered and that Tantaguna should settle the reward, be it the price of a kingdom, with the prince. She returns to her palace; the kings ask Ganja Mara to accompany them, but he pretends that his brains reel and escapes to the house of the old dyer, being afraid that Aman Shah will recognise him.

When the kings of Gangga Buana and Jangga Dupa discuss the matter, Aman Shah says how strongly the stranger had reminded him of Ganja Mara, and relates how Janus had explained his disappearance. A search is made and the robbers are taken. They confess the robbing of Taj Salim and the spiriting away of Ganja Mara by order of the queen of Jangga Dupa. The robbers are thrown into prison, and the king of Jangga Dupa, returning to his palace, banishes the queen from his sight, regretting that he may not kill her. Much frightened she flees to princess Kēmalih, but

the latter, hearing that her own mother is the cause of her husband's death, leaves her to herself, though suffering her to stay in her part of the palace.

Sëntia in the meantime has rallied his troops with the help of Jani, and a few days later leads them to a night-attack on the city of Rangka Duli, in which Jani however takes no part. They succeed at first, and the garrison has great difficulty in defending the town. Ganja Mara, who was with Sëri Maharaja Putëri and the two princesses in the palace, is called by Tantaguna and runs to the house of the old dyer, where Janus is waiting for him with his weapons. Everything is in confusion; the enemy has advanced to the walls. Ganja Mara has the sea-gate opened, and single-handed attacks the enemies, Janus being left behind to defend the gate. Ganja Mara succeeds in driving the enemy back from the gates and the walls, and the kings and Tantaguna, who have come to the walls, wonder at his prowess and think that it must be the nephew of the prince of Chinta Balai. Ganja Mara meets Sëntia, captures and disarms him and dismisses him in the same way as Jani. Sëntia gathers his troops and marches off. Ganja Mara returns with Janus to the house of the old dyer, and on the next morning only the many bodies of the enemy tell of the fight. Sëri Maharaja Putëri sends the two princesses back to their mother; they relate what has happened in the palace, but the kings are unable to trace the connection between the man in the palace and the champion outside the walls. Their only way is to watch the palace closely, and they arrange with Tantaguna that Aman Shah commands the guard of Sëri Maharaja Putëri's palace, but Ganja Mara knows their intentions and evades Aman Shah; the two princesses, too, do not see him for several days. At last Sëri Maharaja Putëri asks the two princesses again to dinner, where Ganja Mara is present, but sends them back to princess Kemalih in feigned anger when they refuse to make the *sëmbah* to Ganja Mara, to be taken back to their parents, and never to return to the palace. When they are gone, Tantaguna is called, and Sëri Maharaja Putëri asks him to invite the kings and their queens and children, their ministers and Anta Dalus to the palace. Big preparations are made; Tantaguna brings the guests, and Janus acts as master of ceremonies. Princess Këmalih, the queen of Jangga Dupa and the princesses of Gangga Buana are fetched by Wang Gëmalä, though Sëri Maharaja Putëri pretends to rebuke the latter for having brought the two princesses to the palace again. Sëri Maharaja Putëri welcomes her guests, and betel is served. Ganja Mara is present, but not introduced, and everybody wonders who he may be. Aman Shah would like to address him as Ganja Mara, but dares not, and only makes a sign to Anta Dalus, whose eyes are fastened on Ganja Mara and Janus. A place next to the kings is left open, where a rich carpet is spread. When Wang Gëmalä urges to commence the meal, Sëri Maharaja Putëri replies that her father is not yet present. Ganja Mara understands, and by incensing his

talisman calls Maharaja Nila Suba, who immediately appears and takes his seat next to the kings. Ganja Mara falls at his feet; Séri Maharaja Putêri, who guesses that the new guest must be Nila Suba, respectfully tenders him her crown, and Anta Dalus. Aman Shah and Janus render the *sêmbah* to him. The surprise of the royal guests increases, until Nila Suba calls Badli Shah to him, calls him his grandson and shows him Ganja Mara as his father. Then Nila Suba turns to the two kings and tells them everything, and mutual recognition, greeting, embracing follow. When the merry meal is over, Tantaguna requests Nila Suba to wed Ganja Mara and Séri Maharaja Putêri, which is done after Ganja Mara has repented his sins (*bêrtaubat*). Janus and Wang Gêmala are also married; Janus receives from Nila Suba a talisman which makes him invulnerable, and he is taught many ruses for the fighting, which Nila Suba prophesies Ganja Mara has still before him and in which Janus will accompany his master, but in which Ganja Mara always will be victorious. Nila Suba disappears, and the others enjoy their happiness, until the young couples and the guests retire. On the following day the marriage of Ganja Mara and Séri Maharaja Putêri is proclaimed in the town.

Sëntia and Jani on their retreat halt in a village and send a letter to Gënta Bumi telling him what has happened and that they will not fight any more. Gënta Bumi and Gënta Lokam are furious at being defeated by a woman and though Gënta Aalam tries to dissuade them, as they are in the wrong, declaring that there must be something more behind the refusal of Sëntia and Jani to renew the fighting, and that victory over a woman brings no glory, but a defeat double disgrace, they call up the kings and armies of all countries subject to Jangga Lawi. Gënta Lokam departs with the first army. Maharaja Sunali leads the vanguard, Maharaja Bali Guda brings up the rear, both mighty princes, whom Maharaja Gënta Bërma had vanquished. The horse of Maharaja Gënta Lokam is four fathoms high (three stirrups are necessary to get on its back), of enormous strength, swiftness and endurance and carries the whole arsenal of the prince: club, four swords, bow and arrows, shield, discus, sling (*ali-ali*), *pêmutar* and lasso. Gënta Lokam meets Sëntia and Jani; when they refuse to follow him, though offering their services anywhere else, he sends them in chains to the capital, where Gënta Bumi is preparing a second army. He banishes them from his state, and they go to another country in the neighbourhood, gather their friends and relations and attack and conquer a number of countries which are deprived of their princess and warriors, who have gone to Jangga Lawi. The sons and daughters of the princes they carry with them, but take good care of them. At last they conquer a big, well fortified town, which they make their capital and centre for further campaigns.

Gënta Bumi with the second army follows his brother; Gënta Aalam remains at home to guard the country.

Gēnta Lokam has reached Rangka Duli, where Tantaguna has prepared everything for the war. Gēnta Lokam sends an embassy of forty champions, who do no obeisance to the kings and arrogantly demand that Sēri Maharaja Putēri be delivered to Jangga Lawi, otherwise they will prepare for war. Janus asks whether they have no eyes to see that all preparations have been made. Only in order to have that information conveyed to their prince will he suffer them to return; otherwise they would have lost their heads the moment they failed to make the *sēmbah*. Rather ashamed they return and are reprimanded by Gēnta Lokam for their unnecessary rudeness. On the following day Gēnta Lokam sends a letter to the ministers and nobles of Rangka Duli; Maharaja Sunali, accompanied by twenty officials, conveys the letter. He is courteously received in the audience-hall and the letter is read, which says that Gēnta Lokam is instructed by his brother to punish Rangka Duli for not following the custom of the world but a woman's whim, and advises them to persuade Sēri Maharaja Putēri to follow his brother's wish; if they decline, he has done his duty towards them and has no other choice but to carry out his sovereign's wish. Sunali adds that the troops of Rangka Duli would be easily scattered by his army, and they should consider well before taking their decision. All are struck by his words, and in a low voice Tantaguna replies that by the bequest of Maharaja Ganda Sin they were bound to obey his daughter, which he had borne in mind when answering the first letter. She had made no other condition but the answering of her ten questions, which had also been the wish of Ganda Sin. Gēnta Bumi had not answered the questions but had tried force. Now the son of Maharaja Shams Aalam of Gangga Buana had answered the questions; their fate was given into his hands, and to his decision they would submit. Sunali asks that Ganja Mara be shown to him, and looking at him he remarks that his features are well suited for his task, and that he doubts which side will suffer defeat, but enumerates the princes, champions and strength of his army. The kings and ministers become uneasy, but Ganja Mara replies that Sunali is right and only deliberation would prevent later repentance. But he had found out that a man in this world is surrounded by enemies, from the elephant down to the sandfly, by Jins and Peri's; how would he be able to live (without the protection of God?). There were two ways which men followed in this world, the one leading to salvation, the other to calamity. Who follows the first, can do no wrong; who follows the second, can do no right. That was his guide-rope to which he would cling. He had hoped to be delivered of his sins by now, but this hope had been destroyed by the arrival of Sunali, who however was only the delegate of a delegate. If the original provoker of this affair were there, he would challenge him to meet him man to man and seek the decision as to who was right and who was wrong. He asks Sunali to try and persuade the mover of all this to spare the lives of his people and submit to the decision of single combat. Sunali

agrees, as he now believes that victory lies in the hands of Ganja Mara. A letter is written to the effect that they have nothing to add to their former letter and that their fate lies with Ganja Mara, whose words Sunali would convey. This he does, and Gēnta Lokam admits that the right is on the side of Ganja Mara, and in a war has always proved to be the greatest asset (*modal*), but he has gone too far and honour does not suffer him to retreat, though he will meet Ganja Mara in single combat. He orders the general attack for the next morning.

The kings are afraid when they see the immense army approaching in order of battle. Ganja Mara and Janus join the troops outside the city-walls. They cheer up when they see Ganja Mara. Gēnta Lokam's battle-drums are not answered by Ganja Mara, and Gēnta Lokam is told the reason why. Mērdan, Gēnta Lokam's strongest fighter, is allowed to open the fight; he has a guard of eight hundred men, all relations of his, with him, and an army of 5,000 men and 3,000 horses, supposed to be the finest fighters of Jangga Lawi. Ganja Mara asks God to forgive him the bloodshed, and armed with the sword of Nila Suba, bow and arrows and a stout cudgel goes to meet the enemies, Janus remaining behind in charge of the troops with the instruction to keep back his men, but not to suffer the enemy to approach the walls. Ganja Mara easily defeats a son and relation of Mērdan, but with the latter he has a hard fight and only after long wrestling can vanquish him. But Mērdan refuses to return defeated is bound and entrusted to Janus to be carried behind the lines. His relations and troops interfere, general fighting begins and Mērdan is freed. Gēnta Lokam sends his best knights to kill Ganja Mara with their lassoes, and he disappears in the turmoil. Janus tries to rescue him, Aman Shah taking command of the troops outside the city-walls. Night comes, the troops of Jangga Lawi are called back, and Ganja Mara also returns. By mere chance he meets Janus in the dark, chasing him first thinking he is a warrior who has deserted his post, and they both return to the city. Ganja Mara meets in the palace Sēri Maharaja Putēri and princess Kēmalih and his two sisters, all weeping in their anxiety for him, but Sēri Maharaja Putēri chafes him that nobody cares for him and that they were weeping for the old kings who had now all that trouble when they had just met their daughter-in-law. After the meal Ganja Mara retires with princess Kēmalih.

On the following morning a council of war is held. Janus is to be allowed to follow Ganja Mara into the fight; Aman Shah shall command the troops outside the town and receives the ring of Kubaya to keep him from harm. At Gēnta Lokam's side Mērdan refuses to fight any more in this war and is sent in fetters to the capital. He meets Gēnta Bumi on his way, who even offers him the kingdom of Rangga Duli if he will fight again, but banishes him when he refuses. Mērdan calls back his relations and army and follows the example of Sēnta and Jani.

Mērdan's place as first fighter is taken by Bēndukar, who is disarmed by Ganja Mara and punished with a whip by Janus when he tries to wound Ganja Mara's horse. He flees back to his friends, arms himself again and captures Janus with his lasso. Ganja Mara frees Janus, and after another fight Bēndukar is bound and brought to the rear, but Gēnta Lokam sends more troops who surround Ganja Mara and Janus, and Bēndukar is able to free himself again, snatches a sword from one of the warriors who guard him and attacks the troops of Rangga Duli, evading however Aman Shah. Ganja Mara and Janus would pursue him, but are kept back by new masses of the enemy. At that moment Gēnta Bumi arrives, and Gēnta Lokam, who thinks at first that auxiliaries for Rangga Duli are coming, orders half his army to turn front. This gives Ganja Mara an opportunity to cut his way through the enemies, and he soon reaches Bēndukar, whom he throws down and binds. Bēndukar laughs: "Were my might ever so great, I could not fight against the right." Ganja Mara unbinds him, and Bēndukar asks to be killed. Ganja Mara refuses, and Bēndukar tells him that he will be invincible, as wrong cannot be turned into right, and asks to be allowed to retire with his clan from this useless war. Ganja Mara gives him a sword, Janus brings him a horse, and Bēndukar, saluting them respectfully, rides over the battlefield, gathers his clan and retires to the foot of the hills. Gēnta Lokam guesses what has happened. When he is informed that it is his brother who arrives with his army, he calls back his troops and goes to meet Gēnta Bumi. They decide to give their troops a few days' rest and then repeat the attack until Rangga Duli falls. Ganja Mara guesses his intentions and divides his troops into three armies, one under Aman Shah to guard the town, the second under Janus to remain in reserves, and the third one to follow himself into battle.

Bēndukar, who does not know that Gēnta Bumi has joined his brother, returns over mountain-passes to Jangga Lawi, but meets only Gēnta Aalam there. He tells him that he will fight no more in this useless war, that right is unconquerable by might, and advises Gēnta Aalam to write a letter to his brother asking him to make peace, which can be done without dishonour, as war is ended by either defeat, victory or peace. Bēndukar has to convey the letter, being promised by Gēnta Aalam that he will be allowed to return if Gēnta Bumi and Gēnta Lokam decide to continue the war.

Three days after his brother's arrival Gēnta Lokam gives order to renew the fighting. Gēnta Bumi wanted to wait and see what Rangga Duli would do, but is told that the other side would never start the fighting, and he leaves everything to Gēnta Lokam, though he feels that he is doing wrong. Their united armies deploy into line, and in great fright the defenders of Rangga Duli observe the immense masses. Ganja Mara says that they must leave the decision to God; he will do his best, but if he should be slain they must do what they think fit; meantime they should recommend

him to God's protection. Silent and weeping they pray for him when he departs. He takes Kubaya's ring and bids Tamsun and Jamsir stay with the kings. At their request he calls Nila Suba by means of his talisman, who at once summons the armies of all the Jins, Peris, Dewas and Mambang and appears on the watch-tower before the kings. He reminds them of the justice of God, who will not suffer the guiltless to be destroyed. He sends Tamsun and Jamsir to fetch Dul Akbar, the battle-horse of Saidina Ali, from the mountain Bēdariah. All wonder at the look of the horse with its small fetlocks and broad hoofs, true to its name. Nila Suba puts the bridle on the horse, places a talisman in its mouth and tells it that to-day it shall carry his son into battle against the unbelievers, that with help of God no harm will come to it; it will not feel hunger, thirst and exhaustion and will obtain great reward in the next world. Ganja Mara takes leave of the kings and mounts Dul Akbar; its neighing frightens all other horses. The armies of Nila Suba, now appear and take their position under the walls of the city, to the relief of the kings and the armies of Rangga Duli. Ganja Mara's first fight is with Tukan, who is captured, frees himself and is killed by Janus. Over his body the general fighting begins, mainly against Ganja Mara, whose back is covered by Janus; the two seem to be invincible. Gēnta Bumi observes them closely and wonders at Dul Akbar, which joins in the fight and seems to carry out every thought of its master. Gēnta Bumi conceives that to fight against Ganja Mara will be useless, but he has gone too far and therefore remains silent. He advises Gēnta Lokam to send half of his army against the troops of Rangga Duli to storm the town and burn it, keeping Ganja Mara engaged so that he cannot assist the troops of Rangga Duli. This is done, and the fight under the walls begins; night comes, but the battle is continued by the light of lanterns and torches.

Malim Dewana at Gangga Buana is aware of what has happened, that Keta Buana is now called Ganja Mara, that he has found his parents and is fighting a big battle, Nila Suba also being present. To greet the latter he wanders with his disciples to Rangga Duli, but arrives at night during the great attack on the town and stays in the forest, praying for the welfare of all true Moslems.

Aman Shah fights valiantly against the masses of the enemy, but near daybreak can hardly maintain his ground, and Nila Suba sends his troops to assist him. At first Aman Shah thinks that the enemy has got between himself and the walls and retires slowly to defend the town, but when he sees the army of Nila Suba attacking the enemy and slowly pressing him back, he joins them in a furious attack, and the troops of Jangga Lawi flee.

Ganja Mara hears the turmoil under the walls and wishes to help, but the enemies do not allow him to pass, and Dul Akbar refuses to be turned, even when Janus tries to lead it. With a heavy heart Ganja Mara continues fighting where he is, until he hears the wacry of Nila Suba's troops and much relieved doubles

his fury. Gēnta Lokam and Gēnta Bumi succeed in separating Ganja Mara and Janus by a wedge of their best warriors, and 1,500 furious elephants are turned against Ganja Mara. The day breaks. Near the city the troops of Jangga Lawi flee, hotly pursued by Aman Shah, whilst the army of Nila Suba has returned to the former position under the walls. In his fear for Ganja Mara, whom he has not seen since yesterday, Aman Shah presses the enemy back to the middle of the battlefield. When Ganja Mara sees that Janus has been separated from him, he attacks the elephants with such fury that they turn and trample Gēnta Bumi's troops under their feet. Gēnta Lokam leads fresh troops against Ganja Mara, and with a few bounds Dul Akbar brings Ganja Mara face to face with Gēnta Lokam. To the latter's surprise Ganja Mara is able to parry his blows with the club, which soon breaks, and also the strokes of his enormous sword, which Ganja Mara says is due to the protection of the guiltless by God. Gēnta Lokam's horse collapses, Ganja Mara also jumps from his horse and they wrestle for a long time, until Gēnta Lokam is getting exhausted. Gēnta Bumi sends his best champions to rescue his brother, but Dul Akbar suffers no one to approach.

Janus and Aman Shah, who are attacking the enemy in a blind fury in order to cut their way through to Ganja Mara, are captured by the lassoes of the enemy. Nila Suba, invisible, flies down to the battlefield and bids Dul Akbar fight in the direction of Janus, whom it soon reaches and frees of the lassoes. Nila Suba gives Janus, a sign to cut his way through to Ganja Mara, and returns to Rangka Duli. Janus succeeds in reaching Ganja Mara, who with a last effort throws Gēnta Lokam, mounts on his back and asks him whether he will leave the way of evil. Gēnta Lokam does not reply, and when Ganja Mara releases him, he jumps up, takes his sword and attacks Janus. Ganja Mara intercedes and slowly forces Gēnta Lokam back. Janus tells him that Aman Shah is captured and Ganja Mara gives him Dul Akbar to help him, but is compelled to assist himself with his arrows ere Aman Shah is freed. The young prince is utterly exhausted; Janus brings him back to his troops and rebukes the feudal princes for having let him go. Without taking food or water, Janus hurries back to Ganja Mara, who mounts Dul Akbar and asks Janus to follow him, as he will try to meet again Gēnta Lokam, who has retired behind his troops and is sending fresh warriors to delay Ganja Mara. Night comes, and Janus asks Ganja Mara to advance slowly, as he finds it difficult to climb over the masses of the dead. Ganja Mara sees how exhausted Janus is and asks him to go back and refresh himself, but Janus refuses to go without him, and Ganja Mara will not turn his back on his enemies. He does not, however, advance any further and contents himself by slaughtering with his arrows the enemies sent against him again and again by Gēnta Lokam, who thinks that Ganja Mara's strength must soon be exhausted.

Aman Shah is fetched into the city by the kings, but as soon as he has recovered and eaten, he rushes again into the battle to look for Ganja Mara, and the feudal princes, unable to keep him back, have no other choice but to follow him. At day-break Ganja Mara bids Janus take a horse and see where Aman Shah is. Janus finds him fighting near the city; he obtains some rice and water which he tries to bring to Ganja Mara. The latter has at last met Gēnta Lokam again, Gēnta Lokam falls, is kicked by his own horse and by Dul Akbar, and Ganja Mara succeeds in throwing him down, jumps from his horse on Gēnta Lokam's breast, draws the latter's dagger and asks him to surrender. Gēnta Lokam struggles in vain and at last confesses that he is as good as a dead man. Ganja Mara replies that he wants nothing but this confession, which means that he will not fight any more in this war, and tells him to return to his country with the knowledge of what is wrong and right. Gēnta Lokam replies that if Ganja Mara releases him he will try to persuade his brother to return with him to Jangga Lawi. If his brother refuses, he must fight on his own account; he himself, being a dead man, may not fight any more. Ganja Mara releases him, gives him back his dagger and salutes him when he departs. Gēnta Lokam returns to his brother, asks him not to fight any more against Ganja Mara, who must be so exhausted that they will be able to capture him easily. Gēnta Lokam replies that he is of the same opinion, and that was the reason why he had accepted his release; he would not return to Jangga Lawi before he had vanquished Ganja Mara, who otherwise was sure to follow them. He continues to send fresh troops against Ganja Mara, whose softer thoughts vanish at this breach of faith, and for two days and two nights he fights incessantly without being able to meet Gēnta Lokam, who rests and recruits his strength. The third night is very dark, and Ganja Mara simply slaughters those who attack him, without advancing any further. At day-break Gēnta Lokam, who thinks him exhausted, approaches from behind and with a tremendous blow tries to kill Ganja Mara. Dul Akbar sees him and jumps aside, but the blow strikes Ganja Mara's shoulder, slips off and strikes Dul Akbar's side. Ganja Mara is thrown down and faints, but Dul Akbar does not suffer Gēnta Lokam to approach and skilfully evades his blows. Ganja Mara recovers and finds himself sitting on the ground with Gēnta Lokam trying to get at him. He jumps up, and cuts off the feet of Gēnta Lokam's horse. Gēnta Lokam is thrown down just when he had swung his club over his head, strikes his own feet and rolls on the ground. Ganja Mara jumps on his breast and shouts: "Hai, raja, is that thy faith (*budi*)?" Gēnta Lokam opens his mouth to sue for mercy, but Dul Akbar crushes his chin with its hoof, and when Ganja Mara tries to push the horse aside, with a second kick crushes Gēnta Lokam's head so that his brains are scattered. Gēnta Bumi sees his brother's death, jumps from his elephant on to a horse and attacks Ganja Mara. The point of Gēnta Bumi's

sword breaks off and buries itself in the earth like a caltrop. Ganja Mara cuts off the legs of Gēnta Bumi's horse, and Gēnta Bumi is thrown upon the point of his sword. He is unable to rise and hurls the stump of his sword at his enemy. Ganja Mara tells him that he should return to his country to have his wound treated and to meditate how the whole affair has brought him no profit. He sheathes his sword, mounts Dul Akbar and rides away. The troops of Jangga Lawi take to flight, carrying their wounded king and the corpse of Gēnta Lokam with them, and all alone Ganja Mara halts on the battlefield on the back of Dul Akbar. The army of Rangga Duli raises a shout of victory, but Janus orders them to be silent. Malim Dewana, who during those four days and nights has waited on the edge of the forest, comes to the battlefield, and kisses Ganja Mara and Janus. They do not know him, but when they hear that he is a fakir from the country of Ganja Mara's father and has come to meet Nila Suba, they guess who he is. They return to the city, where Aman Shah greets them. Arrived at the gate, Dul Akbar refuses to advance and turns his head; Ganja Mara jumps down, and Dul Akbar collapses and dies. Ganja Mara weeps over the body of his charger. Flowers of gold and silver and alms are scattered by order of Tantaguna, and Malim Dewana is welcomed. Nila Suba commands that Dul Akbar be buried where he fell. The town shall henceforth bear the name of Dul Akbar. Nila Suba thanks Malim Dewana for his assistance, which he trusts his son (Ganja Mara) will be able to repay him. He knows that Genta Bumi is to die, and bids the kings prepare, as in three days he will crown Ganja Mara king of Dul Akbar. He returns to his kingdom, and the others to their palaces. Spies report that the troops of Jangga Lawi are hurrying back to their country. Ganja Mara returns to the palace, where his two wives have wept, fasted and prayed for his safe return, though Sēri Maharaja Putēri says it was for the old kings. After they have eaten together with Badli Shah, Ganja Mara takes a long rest, dividing the time between Sēri Maharaja Putēri and princess Kēmalih. His two sisters come the following morning and are chaffed again, but now know how to reply, and Sēri Maharaja Putēri complains that princess Wajah Aljamil should be given into the charge of a religious tutor to teach her modesty and beat her if necessary. Ganja Mara asks where such a teacher could be found. Sēri Maharaja Putēri replies that she knows of one, who however may educate only one of the princesses: he comes from Jangga Dupa. Ganja Mara understands.

Janus, after having buried Dul Akbar, orders the temples of the town to be pulled down. The idols are melted down and the gold is distributed as alms to the poor and to the Brahmans and sages who have adopted the true faith. The old dyer and his wife receive rich presents.

During the days of fighting nobody has thought of Siti Khalilah and Johar Salim, but now the war is over, they are afraid, and visit Janus and ask his advice. He instructs them, and on the following

morning Siti Khalilah visits her sister in the palace. When returning, she is recognised and with her sister brought before the kings and ministers. The robbers are also fetched, and all the culprits are to be impaled. The king of Gangga Buana upbraids Siti Sēlih and Siti Khalilah; they ask for mercy as they have done no wrong but a great service to the king. When the prince had been born, and Malim Dewana had prophesied his fate, they had exchanged the boys during the first days of their life, as at that time the king would hardly notice it, whilst a later separation would have been intolerable. Relying upon Malim Dewana's words they had brought the boy to the island that he might be prepared for the task he had now accomplished to the amazement of the world. Their own merit had come to light, and they would submit to the king's judgment. The king is dumb with surprise; Anta Dalus guesses that his son has suggest this defence, kisses them and says that they have done well. All agree, the king pardons them and promotes them to be the first ladies of the palace. The others are also pardoned, and the robbers are set free after having sworn never to do wrong again.

Festivities commence, and after seven days and nights Nila Suba proclaims Janus grandvizier of Ganja Mara with the title of Mangkubumi, scattering gold and silver-flowers over his head. Nila Suba proclaims Ganja Mara sovereign of Dul Akbar with the title of Sultan Fazl Shah Aalam Nobadz Shah. Malim Dewana reads the prayer with the new title of the Sultan and asks God's blessing on him and his descendants. The assembly pays homage to the sultan and swears allegiance, and Tantaguna reads the concluding prayer. In the palace Ganja Mara pays obeisance to Nila Suba and the kings and pays his respects to Malim Dewana, who is presented with the income of a country for himself and his descendants under charter and seal, whilst in the audience-hall Tantaguna feasts the assembly. The prisoners from the army of Jangga Lawi are given travelling-money to return to their country.

In a letter Sēri Maharaja Putēri acquaints the king of Gangga Buana with her ardent wish, and at Nila Suba's desire Malim Dewana reads the marriage-formula for prince Aman Shah and princess Wajah al-Jamil. Nila Suba and Malim Dewana depart, and the marriage-feast for the young couple is given by Sēri Maharaja Putēri.

Gēnta Bumi dies on his way to Jangga Lawi, and is carried to his capital. Bēndukar meets the returning army, but decides to bring Gēnta Aalam's letter to his brother to Ganja Mara as a proof of Gēnta Aalam's attitude. When Gēnta Bumi's and Gēnta Lokam's bodies are burned, Gēnta Aalam sends for Sēntia and Mērdan, who advise him to proceed to Ganja Mara and leave it to him to decide the fate of Jangga Lawi. Gēnta Aalam marches with a big army to Dul Akbar, where the news of his approach arrives at the moment when Bēndukar is received in audience by Ganja Mara. Bēndukar explains that Gēnta Aalam never had any designs against Rangka

Duli and had tried to dissuade his brothers from using force. He is received by the Mangkubumi with a large escort, and Ganja Mara welcomes him. Gēnta Aalam and Sēntia become converts to Islam. Mērdan refuses, but acknowledges Ganja Mara as his sovereign, and he as well as Sēntia are invested with the countries they have conquered. Gēnta Aalam shall retain Jangga Lawi, but prefers to remain with Ganja Mara to become confirmed in his new faith and Sēntia and Mērdan will govern Jangga Lawi. But after Gēnta Aalam has stayed a long time with Ganja Mara and has become quite a Muslim scholar, he is married to the second princess of Gangga Buana and made king of Jangga Lawi with Bēndukar as his minister. Aman Shah is crowned king of Jangga Dupa. The kings return to their countries, but visit Ganja Mara once a year, until Badli Shah has attained his tenth year and is crowned king of Gangga Buana, under the care of Anta Dalus and the ministers. The old kings go to live at Dul Akbar, where Shah Aalam Nobadz Shah keeps a reign of justice.

Here ends the story of Ganja Mara, which is to show the omnipotence of God, so that readers may become righteous and acquire merit with God, the creator.

Copied from a manuscript in the possession of a white merchant (*karangan saudagar putih*) in the year 1303, on the first day of the month Shaban, that very blessed day, by Mohamad Kassim bin al-marhum? at Penang.



Jawi Spelling

By Zainal-Abidin bin Ahmad.

It has been said with much truth that the Arabic characters are less suited to represent Malay sounds than are the Roman. But it has also been said with hardly a grain of truth that there is no system governing the Jawi spelling of Malay words. The spelling of Malay words written in Malayo-Arabic characters is full of irregularities—and these unfortunately among the most common and every day words. But this does not prove that the same is the case with all the remaining Malay words, or that Jawi spelling is devoid of system. When Malay words are classified there are evident certain general principles governing the Jawi spelling just as there are principles governing the spelling of other languages not possessing a perfect alphabet.

Jawi spelling as it stands to-day is built upon the principle of the *baris* or *harakat* system, which is a peculiar property of the Arabic language, and on the principle of the *huruf saksi* which is a common property of most alphabetic languages. This mixture of divergent principles is partly responsible for the irregularities of Jawi spelling: the problem is where to apply the one and where the other in accordance with popular practice and established usage. But there are other and more important causes too which have given rise to difficulties.

Firstly, the letters of the *Jawi or Malayo-Arabic alphabet were originally all consonants*. As used in Arabic, there is not a single letter which represents a vowel-sound. *Alif*, *ya* and *wau*, now regarded by Malays as vowel-letters (*huruf saksi*), never were and never are vowels in Arabic. Their nature happening to be cognate with the three vowel-sounds in Arabic (i.e. *alif* with *fathah*, *ya* with *kasrah*, and *wau* with *dammah*), they cannot but serve to lengthen these vowel-sounds when one of them follows its cognate. The vowel-sounds in Arabic are all represented by *baris* or diacritical strokes. Thus *pada*, *padi*, *padu*, for instance, are respectively written according to Arabic system Pd, Pd, Pd or قَد قَد قَد

(=in modern Jawi spelling قَد or قَادِي، قَادِي) But as a rule, in Arabic writing even these strokes are used only for unusual or ambiguous words, or when the writing is meant for "parrot" readers. Otherwise when context and grammar show the correct *baris*, they are not employed.

Secondly, the vowel-sounds of the Malay language are not the same in number and kind as those of Arabic. Arabic has only three distinct vowel-sounds, namely, *fathah* (=a), *kasrah* (=i or e) and *dammah* (=u or o), which are rendered in Malay as *baris di-atas*, *baris di-bawah* and *baris di-hadapan*. Malay has at least six vowel-sounds. So, the Arabic system of representing vowels is insufficient to reproduce and distinguish Malay sounds.

These two facts led to a third which explains how the *baris* and *huruf saksi* systems have ultimately come to get mixed up.

When the Arabic alphabet was introduced for the writing of the Malay language, the system of Arabic orthography might have been applied *in toto*, at least as an experiment. But the 14th century Trengganu inscription makes a lavish use of *huruf saksi*, especially *alif*. The subsequent standardized spelling of the 16—17 centuries used them very sparingly, which proves that the scribes of that time had the *baris* system in their minds all the time; and some old manuscripts which have come down to us are fully vocalised with *baris*. But though they knew the *baris* system, they found it quite inadequate. To meet the difficulty they did not introduce new *baris* in addition to the three in use; that would have increased the complication and tediousness of writing, when their desire was, if possible, to leave out the *baris* and write Malay simply without them, as Arabic is generally written. But entire omission of the *baris* was impracticable. The Malay language having a grammar totally different from Arabic and vowel-sounds much more elaborate, the wholesale omission of *baris* would have made the spelling hardly intelligible. Hence these foster-scribes of the Malay language were driven to the only alternative, namely, that of supplying the deficiency of vowels by using letters to represent them.

In the Arabic alphabet, as has been seen above, there are no letters which represent vowel-sounds. So a second difficulty arose. Despite this, و ي ا were adopted to supply the need, seeing that the nature of these letters corresponds with the three main divisions of vowel-sounds in the Malay language. This practice has survived and Malays continue to call and look up on و ي ا as solely *huruf saksi*.

Unhappily for Jawi spelling, early writers did not invent new letters to supply the vacant place of و ي ا as consonants: و ي ا have to serve *both* as consonants and as vowels. Nor did they devise any method to meet the shortage of vowel letters. They overlooked the fact that Malay has really more vowel-sounds than three. Hence

additional work for ا ي و for in functioning as vowels they are inadequate for the sounds they are made to represent, and yet they have to suffice and discharge the functions as best they can. Further the habit of employing the *baris* system had been so far established in the spelling of a large number of words, that Malay writers never dared to spell *kan* in any other way than كن nor تنكف فنجت تمقت بنر etc., in any other way. The result is a mixture of the *baris* system and the *huru* *saksi*.

These are the causes of irregularities in Jawi spelling. They are not to be found in the consonants of the Jawi alphabet: We have more consonants than enough. The main causes of irregularities are the three-fold defects indicated above, the omission of *baris* being the most important; and all three may be traced directly or indirectly to these three letters ا ي و. To summarise, these causes were:—

- (1) ا ي و have to serve both as vowels and consonants.
- (2) As vowels, ا ي و have to do duty for at least six Malay vowel-sounds. Obviously three vowel-letters are not sufficient to represent six vowel-sounds.
- (3) As consonants, ا ي و are liable on the omission of *baris* to be confused with ا ي و as vowels.
- (4) The sum of the above is that ا ي و are made to carry more burden than they can reasonably do. By borrowing ا ي و to serve as vowels extra responsibility is thrown upon them.

One or two other causes too may be added which are not as important, for they only produce exceptions, not confusions or complications; e.g.:—

- (5) Words which have crystallised according to the old *baris* system of spelling survive isolated but unaltered.
- (6) Most Arabic loan-words have to conform to Arabic rules of orthography, unless old-established practice has decreed otherwise.

Thus it has come about that Malay writing in Jawi labours under disadvantages too serious and fundamental to be able to have perfectly phonetic spelling like Romanised Malay.

In spite of all this, a Malay who knows his language pretty thoroughly never experiences any difficulty in reading it as now written in the Jawi character. Vocalisation (i.e., the marking of *baris* or any other of the diacritical marks system) is not at all necessary at the present day, except in a few proper names, foreign words and a few rare cases where the context fails to indicate which of two (or more) possible readings, is the right one. And for these purposes it is still in occasional use.

THE MALAY VOWEL-SOUNDS HOW THEY ARE REPRESENTED IN JAWI.

There are nine vowel-sounds in Malay, which fall into three classes:—

- (1) '*Atas*,' corresponding in a general way to *Fathah* or 'mouth-opening' sound in Arabic which is represented by the stroke \diagup .
- (2) '*Bawah*,' corresponding in a general way to *Kasrah*, or 'lip-breaking' sound in Arabic which is represented by the stroke \diagdown .
- (3) '*Hadapan*' (shortened to *Dēpan*), corresponding in a general way to *Dammah* or 'lip-pushing' sound in Arabic, represented by the stroke \smile .

But unlike the Arabic vowel-sounds, each of the three classes is sub-divided into three. These are:—

ATAS	{	' <i>Atas Halus</i> ' which has no Arabic counterpart.	
		' <i>Atas Sēdang</i> ' which has no Arabic counterpart.	
		' <i>Atas Kasar</i> ' which is the same as the Arabic <i>Fathah</i> .	
BAWAH	{	' <i>Bawah Halus</i> ', generally equivalent to the Arabic <i>Kasrah</i> .	
		' <i>Bawah Sēdang</i> '	both have no equivalent in the most accepted Arabic pronunciation.
		' <i>Bawah Kasar</i> '	

HADAPAN	' <i>Hadapan Halus</i> ', generally equivalent to the Arabic <i>Dammah</i> .	
	' <i>Hadapan Sëdang</i> ' }	
	' <i>Hadapan Kasar</i> ' }	
	both have no equivalent in standard Arabic pronunciation.	

Closer observation does not warrant the strict identification of Malay sounds with those represented above as their equivalents in Arabic. Nor does the description that the *halus* and *sëdang* sounds in the case of *atas* and the *sëdang* and *kasar* sounds in the cases of both *bawah* and *hadapan* have no equivalents in Arabic hold good always. For both the Arabic and the Malay sounds vary in different local dialects.

The following table illustrates the various Malay sounds:—

Primary Divisions	Halus (Narrow)	Sëdang (Medium)	Kasar (Broad)
Atas	bësar (ا) + ر	kita (ت) + ك	mati (ما) + تي
	tërkam (ر) + كم	ada (د) + ا	habis (ها) + يس
Bawah	kiri (ي) + (ك) ري	pasir (س) + ق سير	merah (ا) + ره
	pisang (غ) + ف غ	bilek (ي) + (ل) ليك	belek (ليق) + ي
Hadapan	guru (و) + (ك) كور	jatoh (و) + ج جات	pokok (و) + (ك) كوك
	baju (و) + ج جابو	patut (و) + ق قات	bohong (غ) + (و) بوغ

For practical purposes six of these nine are sufficient, unless a thorough study of Malay phonetics and of the different shades of pronunciation in the various dialects is desired. These six consist of the *halus* and *kasar* of each class, the *sëdang* a middle type being omitted.

We are able to represent each of these six by Roman vowel-letters:

<i>Atas Halus</i>	ë
<i>Atas Kasar</i>	a
<i>Bawah Halus</i>	i
<i>Bawah Kasar</i>	e
<i>Hadapan Halus</i>	u
<i>Hadapan Kasar</i>	o

The first is a letter evolved from *e* to represent what is called in English 'the indeterminate vowel.'

In the current system of Jawi writing all of these six vowel-sounds except *ē* are represented by the over burdened *huruf saksi* ي and و, each of which does duty for one class, irrespective of the fact that each of the three classes comprise more than one distinct sound. Thus *alif* (ا) is used for *atas kasar*, ya (ي) for both *bawah halus* and *bawah kasar*, and *wau* (و) for both *hadapan halus* and *hadapan kasar*; while usage has left *atas halus* unrepresented by any vowel-letter, it having always been regarded (and quite rightly) as a short vowel. Consequently, we have, for example:

م for *mē*

ما for *ma*

مي for both *mi* and *me* (and incidentally also for the diphthongal syllable *mai*, which was originally written

مي where the ي was in the capacity of a consonant).

مو for both *mu* and *mo* (and also for *mau* which pro-

perly should be written مو where the و was originally a consonant).

This insufficiency of Jawi vowels leads to frequent confusion and uncertainty of pronunciation when Malay is written in Jawi.

In connection with *Atas Halus*, which is never represented by the *huruf saksi alif* or any other, it must be noted that

(1) in such words as امڤت (*ēmpat*) the initial ا is not a *huruf saksi*; it is merely the hamzated *alif* which must appear as initial as a sort of peg to hang the vowel on. Properly it represents the opening of the wind-pipe in this position.

(2) an unvowelled consonant such as ك س م may also stand for the sound *ma*, *sa*, *ka* and so on in certain combination: نام, راس, مولك (*nama*, *rasa*, *muka*).

For comparison of the Jawi and Romanised vowel-systems, the following table will be helpful:

Primary Divisions	Subdivision of each	Romanised Vowels	Jawi Vowels
Atas	Halus	ē	nil
	Kasar	a	ا
Bawah	Halus	i	ي
	Kasar	e	
Hadapan	Halus	u	و
	Kasar	o	

THE OPEN AND CLOSED SYLLABLES.

Each of the six sounds described above assumes, on becoming word-syllables, two distinct characters:

- (1) The 'open' syllable (*bunyi lēpas*) such as *ba, bi, bu, bē, be, bo*.
- (2) The 'closed' syllable (*bunyi bērpadu*) such as *ban, bin, bun, bēn, ben, bon, bal, bil, bul, bas, bis, bus, bang, bēng, bong*, etc.

The syllable is 'open' when there is nothing to check the flow of the vocal sound after a vowel has been pronounced. The syllable becomes closed by the suffixing of some consonant to the vowel.

In purely Malay words the sounds represented by *b, d, g, ch, j* (ج چ ک د ب) and the real sound of *k* (ق ک) never close a syllable; while *t* and *p* (ف ت) only close final syllables; and the glottal plosive written *k* as a final (e.g., the sound represented by ک and ق in باءیک and بودق respectively) does not occur as a written symbol in the middle of purely Malay words. But

excepting these, any other consonant representing native sounds may close a syllable.

This subdivision into 'open' and 'closed' syllables has an important bearing on the issue of modern Jawi spelling, when we come to differentiate the rules applied to the spelling of the various kinds of syllables. In one class of syllables, at least (*Bunyi Atas Kasar*), it decides the question where to use the *saksi* ۱ and where

an assumed *baris di-atas* (.....) should suffice in place of ۱
(e.g. ڪ = *ka* and ڪن = *kan*). The importance of distinguishing between the 'open' and 'closed' syllables in Jawi spelling becomes evident from the following two broad general rules, as observed in the practice of to-day:—

- (a) *Atas Halus* sounds, whether 'open' or 'closed,' and all 'closed' *Atas Kasar* sounds, must be written without *huruf saksi*.
- (b) With certain exceptions in each case, all open *Atas Kasar* sounds, all *Bawah* sounds whether 'open' or 'closed,' and all *Hadapan* sounds whether 'open' or 'closed,' must be written with the *huruf saksi* ۱ or ۱ or ۱ as the case may be.

By this subdivision into 'open' and 'closed' sounds, the six Malay vowel-sounds are split into twelve kinds of distinct syllabic sounds, indicated here by the following names:—

(1) ATAS.

1. Atas Halus Lēpas (open *Atas Halus*).
2. Atas Halus Bērapadu (closed *Atas Halus*).
3. Atas Kasar Lēpas (open *Atas Kasar*).
4. Atas Kasar Bērapadu (closed *Atas Kasar*).

(2) BAWAH.

5. Bawah Halus Lēpas (open *Bawah Halus*).
6. Bawah Halus Bērapadu (closed *Bawah Halus*).
7. Bawah Kasar Lēpas (open *Bawah Kasar*).
8. Bawah Kasar Bērapadu (closed *Bawah Kasar*).

(3) HADAPAN (DĒPAN).

9. Dēpan Halus Lēpas (open *Dēpan Halus*).
10. Dēpan Halus Bērapadu (closed *Dēpan Halus*).
11. Dēpan Kasar Lēpas (open *Dēpan Kasar*).
12. Dēpan Kasar Bērapadu (closed *Dēpan Kasar*).

It is of these twelve syllabic sounds that all Malay words are composed. One or more of them form the syllabic elements which combine to make up any word in the language. If there are found other syllabic sounds than these twelve, they must be the product of those vowel-sounds which, for the sake of simplicity, have been omitted from our list, but which, strictly speaking, exist in Malay. However, these twelve will satisfy the purpose of this paper. The

following table gives examples of them as the initial, medial, and final syllable of a word:—

Primary Divisions of Vowel-Sounds	Subdivisions of Each	Open Syllable			Closed Syllable		
		initial	medial	final	initial	medial	final
Atas	Halus	سر (س) غه (غ) تبه (ل)	ته (ت) لمغ مه (ت) ري به (ل) دو	nil	ك (ر) فخوان ك (ل) جيت - (م) ككه	ك (ر) فخوان ك (ل) جيت - (م) ككه	nil
	Kasar	كر (ب) كوت (ت) ري (ل)	به (ر) ني - (ت) فغ - (ل) تو	تيه (ب) تا (م) كو (د)	ك (ر) كيت ك (ت) دا ك (م) ميغ	ك (ر) كيت ك (ل) يو به (ل) جا	يو (ج)ف ل (ك)س هي (ت)م
Bawah	Halus	غو (ت) را (ك) تم (ه)	به (ت) تا ك (ل) تا سم (ب) لو	به (س) تا (ل) بو (ب)	تيه (ك)ف ك (م) كو سيه (ل)ول	د (ر) دو ك (ت) ديغ ك (ل) كل	سا (ك)يت ك (ل)غ كو (د)يس
	Kasar	به (ل) بر جا (م) ليق (ك)	ك (ر) تا به (د) را به (ل) رخ	nil	تيه (ب)ق ر (د) دا ل (ل) كر	ك (ر) ته ك (ل) كغ ك (ل) بغ	ل (ل)يه كو (ل)يق د (ر)يت
Dëpan	Halus	به (ا) بي غا (ب) ف (ل)	ك (ت) ف ك (م) دي به (ل) كغ	له (ف)و فا (ك)و ري (ب)و	او (ا)فن ك (و) تيغ تو (ل)كو	ك (س)وه ك (ل) جوق ك (م)و تيغ	به (ت)ول ها (ل)وس اي (ك)وت
	Kasar	رخ (ا)و لا (ب)و دا (ر)و	- (ك)و له ك (ل)و لا ك (ب)و ج	nil	ل (و) ف ب (و) كر ل (و) تبه	ك (ر)وه ك (ل)وه ك (ر)و جوق	يو (د)ه سيه (ر)وه تيه (ف)وق

In the case of *Atas Halus*, neither the 'open' nor the 'closed' form of it is ever found as a final syllable; unless perhaps the 'open' *Atas* found as a final syllable in words like *kata*, *raja*, *lima* etc., as pronounced in Southern (and many other) Malay dialects are counted as a variety of *Atas Halus* instead of *Atas Sédang*—a sound that has been left out of this discussion. Similarly, 'open' *Bawah Kasar* and 'open' *Hadapan Kasar* are never found as final syllables in purely native words.

'Closed' syllables in pure Malay words are never followed by a second closing consonant, such as are found in foreign words like ليسة (list), فرينس (prince), ستيم (stamp) where the *s*, *n*, and *m*, closing the syllable are respectively followed by *t*, *s*, and *p*.

Most open syllables in Malay, except *ě* and final 'open' *Atas* in certain combinations, are now written with the *saksi* ا or ي or و. According to the old system of spelling, it appears to have been the usage that ا ي و were mostly used with penultimate or stressed syllables only, in consideration of *stress* as described below. But later practice, following the adoption of the *huruf saksi* system has, in the majority of cases, introduced ا ي و even to the final 'open' syllable.

With 'closed' syllables, modern tendency is inclined to leave all *Atas Běrpada* whether *halus* (*ě*) or *kasar* (*a*) as they have been written from early days, i.e., without any *saksi*. But in the case of *Bawah* and *Hadapan* it is more inclined to use the *saksi* ي and و respectively, rejecting the old unvowelled spellings like فغكل تمبق etc., each with two or more possible readings, as confusing and therefore faulty.

Many words as now written in Jawi are still without fixed spelling, some people writing them one way and some another. This is obviously because these words are still in a transition stage as regards spelling, not having reached any definite stand one way or another. The fixed stage they will reach when novels and new literature with uniform spelling have invaded the market, and Dictionaries and Spelling Books have been written to systematise and standardize the principles of present-day usage.

LENGTH, STRESS AND INTONATION.

Length and *Stress*—two absolutely distinct factors in speech, though the one is apt to influence the other—in the Malay language have often been confused even by observers of the present day. The old writers of Jawi seem never to have distinguished the two, to judge by their use of *lengthening* ا ي و in all *stressed* open syllables.

Both *length* and *stress* exist in Malay, as in most, if not all, languages. The stress is decidedly slighter than in English; and in simple words (*pĕrkataan asal*) it is normally on the last syllable but one, unless—

- (1) that syllable is open and its vowel is ě (*Atas Halus*), as in بلا (*bĕla*), دفا (*dĕpa*), كنا (*kĕna*), لمه (*lĕmah*);
- (2) the middle consonant is ه (*h*) between two vowels of similar quality, such as بهارو (*baharu*), سهاج (*sahaja*); in which cases the stress is on the final syllable.

The early writers apparently regarded these *stressed* syllables, when they were 'open', as *long* syllables. Nearly always we find in their spelling ا or ي or و used with such penultimate (or stressed) open syllables; while the final (or non-stressed) syllables, though 'open' also, are left without them; e.g., هات (*hati*), مات (*mati*), لاگ (*lagi*), هار (*hari*), كام (*kami*, or *kamu*), كيت (*kita*), فليت (*pĕlita*), چريت (*chĕrita*), هين (*hina*), ليم (*lima*), اين (*ini*), ايت (*itu*), بوغ (*bunga*), كود (*kuda*), گون (*guna*), مول (*mula*) جوگ (*juga*), موار (*muara*), اف (*api*), سات (*satu*) and so on. On the other hand, words, in which neither penultimate nor final syllable is pronounced with distinct stress, were spelt without the lengthening ا or ي or و e.g. فد (*pada*), مك (*maka*), سد (*sudah*), كفل (*kapal*), فهاغ (*Pahang*), جك (*jika*), بك (*bagi*), and sometimes جد or جاد (*jadi*) etc. But in those days ا ي و were used only as lengthening letters after the fashion of Arabic, and

never as *saksi*. Hence it seems certain that these stressed open syllables (with the exception of *ē*) were considered long. Nowadays some of these old spellings have become obsolete and been discarded to avoid chaos, while others, firmly established before the *huruf saksi* system, came into vogue, like *چك سوات فد ايت اين* etc., have been retained.

In derived words (*pĕrkataan bĕrtambah*) the problem of stress is more complex, and it is difficult, perhaps impossible to evolve regular rules. But the general rule that the stress is on the penultimate still holds good, except that now the penultimate in this case is the syllable preceding the final syllable of the added suffix. Usually the final syllable of the original word becomes the penultimate in the derived words. This accounts for the shifting of the 1 or adding of one, to the end in words like *راج* ; *فرکتان کات* ; *میتاکن بات* ; *دسوکامی سوک* ; *کگونان گون* ; *کرچان مکانن ماکن* ; *ایغاتی ایغت* ; *کناشن کنغ* ; *دیامی دیم* and so on, (though there are a few which do not follow that rule, e.g. *کسلامتن سلامت* ; *کمالسن مالن* ; *دارتن دارت* and a good many which are written both ways: *کارغن کارغ* or *اوبه* ; *دغارې* or *دغري* ; *دغارن* or *اجران اجر* ; *کراشن* or *قروابهن* etc.)

As to *length*, the vowel in 'closed' syllable is nearly always short. An exception is a *final stressed* syllable ending in *r*, when the vowel is long; e.g., *بسر* (*bĕsar*), *فقیر* (*pĕtir*), *تلور* (*tĕlor*). But even this rule does not operate regularly.

The fact that "closed syllables are nearly always short" was rightly noticed by the early Jawi scribes, and rigidly adhered to in their spelling; that is, they never used the lengthening letters و 1 ی with such syllables. Hence we find forms like *تंबق* for *tambak*, *tembak*, *tembok*, *tombak*, *tumbok*, *tĕmbok*; *تنگل* for *tanggal*, *linggal*, *tunggal*, *tunggul*; *کمبغ* for *kĕmbang*, *kĕmbong*, *kambing*, *kumbang*; *تمبغ* for *tambang*, *timbang*, *tumbang*, *tombong*; *سمغه* for *sampah*, *sumpah*; *تندق* for *tandak*, *tandok*,

tindek, tundok; سڠكه for *singguh* and *sunggoh*; فڠگل for *panggil, panggal*; فڠگڠ for *panggang, panggong, ponggong, pinggang*; تنجڠ for *tanjong, tunjang*; تيڠ for *tiang* and *tiong*; انتن for *antan* and *intan*; هيڠڠ for *hidang* and *hidong*; هيڠڠ for *hidap* and *hidup*; تاهن for *tahan* and *tahun*; ماسق for *masak* and *masok*; تمڠا for *tēmpa* and *timpa*; سمڠن for *sampan*, and *simpan*; رمبرا and تمبرا for *rimba* and *timba* respectively; هندو ڤنتو and ڤندو for *pintu, Hindu, pinjam*, and *pindah* respectively; چيم for *chium*, and همڤون or همڤن for *himpun* and so forth. Examples can be multiplied almost indefinitely; many of them have been brought into conformity with modern usage, while a few still survive in the old form.

In open syllables, the vowel may be long or short, and as far as can be seen, there is no rule. It is to be noted that the presence of a *huruf saksi*, which denotes length of vowel in Arabic, does not necessarily denote length of vowel in Malaya words. In fact, in modern Jawi, ا ي و when used to support consonants are always looked upon as vowels, their lengthening quality being only thought of when they occur in loan-words from Arabic.

Intonation (or pitch variation), which is a third distinct factor in speech, also exists in Malay. But its position in a word or sentence can hardly be assigned to any particular syllable or group of syllables. Where it comes in and where not, depend largely upon dialectic peculiarities and upon the different ways it is used to give emphasis and expression in reading or speaking.

There are no words in Malay that differ merely in stress, length of vowel, or intonation, or any combination of these. These elements therefore do not affect the meaning; but their mispronunciation may make it more difficult for the listener to understand the speaker readily.

THE EVOLUTION OF ا ي و

It has been shown that *alif, ya, waw* (ا ي و) were originally used in Jawi as they are used in Arabic, i.e. as consonants and lengthening letters; that their use as *huruf saksi* (vowels) has been evolved only in later days; that, at the same time, their original

power as consonants has never disappeared in Jawi; and that therefore the three letters as employed in modern Jawi fulfil the functions of consonants as well as vowels.

Consequent on this development it became the practice to regard them solely as *huruf saksi*. This was perhaps because people were intoxicated with a change in which they found themselves so much at home. In course of time, the original function of the three letters as consonants and lengthening auxiliaries became lost sight of and at last forgotten. Were one to ask any ordinary Malay writer to-day what *ا ي و* are and what purpose they serve in the scheme of Jawi orthography, the answer one would receive is that *ا ي و* are *huruf saksi*. That these same *ا ي و* are also *huruf bēnar* (consonants) scarcely ever strikes the average Malay.

The late Dato' Bēntara Dalam of Johore, (Muhammad Ibrahim Munshi, a son of Munshi Abdullah), came near the mark when he distinguished in his pamphlet, *Pēmimpin Johore* (Guide for Johor) between *ya halus* and *ya kasar*, and between *waw halus* and *waw kasar*; and called the *ya* at the end of words like *سوشي سڤئي كدي* (*kēdai, sampai, sungai*) *ya mēlēmpai* (the long-bending *ya*), and the *waw* at the end of words like *ليمو فيسو كرو* (*kērbau, pisau, limau*) *waw mēlengkong* (the circular-bending *waw*). He laid down among others the rules that *ya kasar* should be written *ي* and *ya mēlēmpai* *ي*, while *waw kasar* and *waw mēlengkong* should be represented by *و* and *و* respectively. But after 30 years his scheme has not come into general use, and remains an academic proposition among a limited circle in Johore. Moreover, besides describing *ا ي و* as *huruf saksi* in the usual way, he only takes notice of the power of *ي* and *و* as an element to form diphthongs in final syllables. The fundamental fact that *ا ي و* are also used as consonants both initially and medially, causing as much trouble there as when *ي* and *و* are used to form diphthongs, he overlooks or ignores.

The duplicity of functions assumed by *ا ي و* which,—together with their defective capacity to function as vowels,—must be

recognised in any attempt to unravel the complexities of Jawi spelling, is illustrated by the following table:—

Letters	As Consonants		As Vowels	
	Commencing a syllable	Closing a syllable	<i>Halus</i> sound	<i>Kasar</i> sound
ا .	انق ايكن انق انتھ اوقھ اورغ	تا ما نا جي . کو کو . لو . لو .	nil	با با فا کو ھاري سفاتو کلادي کناغا
ي	يقيم کاي بايغ سايغ باير کايو	سري بھکي فندي فوني ھلي فاکي	ايرغ گيلغ ديري فيغي بسي بومي	ايرغ گيلغ فيرق ميرھ سيروغ گوليغ
و	واجب وکيل باوا باوھ جاوي کاون	کريو گورو سيلو کاجو ھيجو فانو	کو کو بودق تبو بيرو	بودھ فوکو . چيندوق گوريغ

From the strict phonetical point of view, the ي and و which are described here as consonants closing the final syllable in examples like فندي (*pandai*), کربو (*kərbau*), etc. (vide 3rd column in the above table), are not consonants at all. They are respectively equivalent to the *i* and *u* elements (which are more nearly *e* and *o*) of the diphthongs generally written *ai* and *au* in Romanised Malay. Actually the tongue in such cases does not get even as high as *i* or *u*, let alone to the *y* and *w* positions. But for the sake of simplicity, all such ي and و have been counted throughout this discussion as consonants, equivalent to *y* and *w* respectively. This follows the way of Arabic script which treats them as consonants; for, though Arabic script and its ways are quite another matter, it was after all the origin from which Jawi spelling has drawn many of its phonetical theories.

Whether it would be well for Romanised spelling to follow the Jawi in this point is arguable and depends on various considerations. Many people do not object to *ay* and *aw* (e.g. *panday*, *kərbaw*, etc.)

which are in common use for Arabic. But it may be urged that they would tend to mislead the foreign reader, and they are not more correct, from the phonetic point of view, than *ai* and *au*. Their advantage would be to distinguish final diphthongs from the cases where *ai* or *au* occur together but do not form the same sort of diphthongs (e.g. *mau*, *baik*, *laut*. In these the *a* element is undoubtedly longer (and probably a trifle further back and lower in tongue position) than in such words as *sungai*, *kərbau*, etc.

The modern use of ا ي و in Jawi as described in the above table may be as follows:—

ا —HAS TWO POWERS.

(i) To serve as *huruf saksi* (vowel-letters) for the sound called *Atas Kasar*; e.g. ا in the words باوا (*bawa*), پارا (*para*), باجو (*baju*), لام (*lama*), گولا (*gula*), کالا (*kala*), مات (*mata*), جاري (*jari*), ميجا (*meja*), غاغا (*nganga*), etc., where ا = *a* in Romanised Malay.

Atas Halus is never represented by any vowel-letter: the consonant which makes an *atas halus* syllable is always pronounced by itself without the help of any vowel-letter, though the absence of a vowel letter in the case of a "live" consonant (i.e. a consonant forming a syllable) in Jawi implies as in Arabic the presence of an unwritten *baris*. Observe the first syllable in the words بنر (*bēnar*), تېو (*tēbu*), رېه (*rēbah*), لېمه (*lēmah*), گلي (*gēli*), بېسر (*bēsar*), كچيل (*kēchil*), كنا (*kēna*), دفا (*dēpa*), etc.

(ii) To serve as a consonant like any other consonant in the Jawi alphabet. In this capacity we find it in such words as ايت (*itu*), اين (*ini*), ايكن (*ikan*), اورغ (*orang*), ايكور (*ekor*), يسوق (*csok*), اوتق (*otak*), اومفت (*umpat*), ابغ (*abang*), انق (*anak*), ايم (*ayam*), اون (*awan*), امفت (*empat*), امبون (*embun*), امق (*emak*), امس (*emas*), انم (*enam*).

Essentially, *alif* in this consonant-capacity is no other than *hamzah* (ء) or *alif bongkok* (as the latter is sometimes termed)

which is only another form of it. In fact, when the consonant power of *alif* comes in the middle, or at the end, of a combination or word, the *hamzah* form of it must be used; e.g. فوڪوءَ انجيءَ (Ēnche') (pokok), سئورغ (sa-orang), ياءِيت (ia-itu), فاءِيده (fa'edah), etc. But this should not lead one to conclude that a consonant *alif* and a *hamzah* have identical functions in every respect.

ي —HAS THREE POWERS.

(i) To serve as *huruf saksi* for the sound called *bawah halus*; e.g. ي in the words اِيڪن (ikan), اِيڪوت (ikut), كِيرِي (kiri), تَالِي (tali), كِيٲس (kipas), سَالِين (salin), كَلِي (gèli), چوري (churi), etc., where ي = *i* in Romanised Malay.

(ii) To serve as *huruf saksi* for *bawah kasar* sound; e.g. ي in the words اِيڪور (ekor), تِيغوق (tengok), لِيغه (lengah), لِيبر (lebar), لِيهر (leher), مِيرِه (merah), مِيجا (meja), بِيلا (bela) etc., where ي = *e* in Romanised Malay.

(iii) To serve as a *huruf bènar* (consonant) like any other consonant, and this power never exists together with its power as a vowel; e.g. ي in the words اِيَم (ayam), كَاي (kaya), سَايغ (sayang), بَايَر (bayar), كَايُو (kayu), سَايُور (sayor), كُويغ (goyang), فُويوه (puyoh), يَحْيَا or يَحْيِي (yahya), etc., where the ي is = *y* in Romanised Malay.

Similarly the ي which comes in as a diphthongal element in the final syllable of words like كَدِي (kèdai), سُونِغِي (sungai), فُنْدِي (pandai), هَلِي (hèlai), may also be regarded in practice as consonants, though as explained before it is not really so.

ي —HAS THREE POWERS.

(i) To serve as *huruf saksi* for *hadapan halus* sound; e.g. و in words like سُوڪو (suku), بُوغَا (bunga), بُوڪُن (bukan), لُوڪ (luk).

(*luka*), گولا (*gula*), باتو (*batu*), سافو (*sapu*), هالوس (*halus*), etc., where the و = *u* in Romanised Malay.

(ii) To serve as *huruf saksi* for *hadapan kasar* sound; e.g. و in the words اورغ (*orang*), فوكو (*pokok*), كولم (*kolam*), بولا (*bola*), گوليک (*golek*), چوليک (*cholek*), گولو (*golok*), بودو (*bodoh*), روبو (*roboh*), بوغ (*bohong*), etc., where و = *o* in Romanised Malay.

(iii) To serve as a *huruf bĕnar* (consonant), when its power as *huruf saksi* disappears for the nonce; e.g. و in the words باوا (*bawa*), وايغ (*wayang*), چاون (*chawan*), ورن (*warna*), جاي (*Jawi*), ليوات (*lewat*), ديوي (*dewi*), etc., where the و is = *w* in Romanised Malay.

As to the diphthongal و which appears at the end of words like انگو (*ĕngkau*), هيجو (*hijau*), درو (*dĕrau*), کالو (*kalau*), ليمو (*liman*), ليمو (*limau*), قيسو (*pisau*), etc., the same remark applies as made above for ي in similar cases.

ALIF AND HAMZAH.

A few points about *alif* and *hamzah* deserve notice. Generally speaking, when *alif* functions as a consonant, it is, pure and simple, a *hamzah* (ء) in value. In Arabic both *alif* and *hamzah* are symbols of the glottal plosive,—the opening (and sometimes the shutting also) of the windpipe in the laryngeal position. In Malay it is doubtful whether this opening is normally present in an initial position (i.e. whether there need be such explosion before *all* initial vowels), unless there has been some special reason for closing the windpipe at the end of the last preceding word in the sentence or breath group; which would be the case if the last word ended in *k*, *t*, or *p*; e.g. بودق اوغ (*budak Awang*), دافت ايکن (*dapat ikan*), چاکف اورغ (*chakap orang*). But that is what initial *alif* purports to represent.

Initial *alif* is, by definition, hamzated *alif*. What vowel it serves to introduce can, in the absence of an immediately following *huruf saksi*, only be indicated by one or other of the *baris*. Hence we have:—

- (a) When *alif* commences a syllable with *atas* sound, it has an independent power; and like *a* in Romanised Malay, it can produce a syllable by itself independently of the help of any other letter; e.g. (for *Atas Kasar*):

اڤڠ (ebang), اڤر (ajar), اناڤ (anak), اكو (aku),
 اڤس (atas), اڤر (akar), اڤم (ayam), اڤو (awak),
 اڤا (ada), اڤاڤ (angkat), اڤاڤ (ambil), اڤوڤ (antok);
 (for *Atas Halus*): اڤما (ěmak), اڤما (ěmas),
 اڤما (ěnam), اڤما (ěngkau), اڤما (ěmpat),
 اڤما (ěmbun), اڤما (ěntah).

In most of these examples the *alif* is purely a consonant, having assumed its present "independent" appearance only through the omission of the *baris di-atas*. But in the case of *Atas Kasar Lēpas* (i.e. in examples like اڤاڤ اڤاڤ اڤاڤ), the *alif* has in a manner its consonant-capacity and vowel-capacity blended and operating together. It is quite possible that this also has resulted from the omission of the *baris*. But a comparison with the first syllables in words like مات (mati), سات (satu), كام (kami or kamu) of the old spelling—syllables in which the consonants were coupled with lengthening *alif* for being accented—would lead one to believe that even before the *baris* was omitted the blend must have occurred. The omitted *baris* should be re-introduced when necessary to avoid uncertainty as to the correct reading; e.g. اڤوت (Ayut), اڤه (ayah) as distinct from اڤوت (Iyut) and اڤه (ch!) respectively. In modern

Jawi, cases occur where it is usual to write such *alif* with a *hamzah* on the top of it, thus اڤ. This is perhaps done in imitation of modern Arabic script (which has ا or ا respectively for a *fathah* or a *kasrah alif* in initial position), and is adopted to mark that the *alif* is to be treated not as a vowel but as a consonant. Some think the combination signifies that the *hamzah* represents the consonant-capacity in the blend, and the *alif* the vowel-capacity. The use of *hamzah* there is especially necessary when without the

hamzah the proper reading is liable to become uncertain owing to isolation from context or to mere unfamiliarity. For instance words like دأتس (*di-atas*), كأتس (*ka-atas*), ساءكن (sa-akan-akan), ساءمقام (*sa-umpama*), etc. are liable to become *datas*, *katas*, *sampama* etc., especially to beginners, when no *hamzah* is placed over the *alif*.

- (b) When *alif* commences a syllable with *bawah* or *hadapan* sound, it goes like any other consonant with the vowel *ya* or *waw*, assisting them to produce their inherent sounds. For, unlike *i, e, u, o* in Romanised Malay, ي and و cannot be initial vowels; e.g. *Alif* assisting *ya* vowel: ايكات (*ikat*), ايبو (*ibu*), ايكور (*ekor*), ايلوق (*elok*), ايندغ (*indang*), اينده (*endah*); *Alif* assisting *waw* vowel: اوبه (*ubah*), اولر (*ular*), اوتق (*otak*), اورغ (*orang*), اومغن (*umpan*), اومبق (*ombak*).

It is obvious that *alif* here has only its consonant-power. Where uncertainty is likely to occur as to the correct reading intended, such *alif* when it goes with ي should be vocalised with the *kasrah* sign in order to indicate the *bawah* sound; and when it goes with a "live" *waw* and its sound is *hadapan*, the *dammah* stroke should be placed upon it. Example of the first have been

given above : examples of the second are اواق (uwak-wak), اوان (*uwan*), اواف (*uwap*), etc., though in common practice these latter are usually written in Jawi without the first *alif* at all, and in Romanised they are commenced with a *w*; *wak-wak*, *wan*, *wap*, etc.

- (c) Like all other consonants, a consonant *alif* can also form a 'closed' *atas* syllable (i.e. *atas berpadu*) with *ya* and *waw*, and the *baris di-atas* is again necessary on the top of the *alif* (thus آ) to avoid such syllables being taken for *bawah* or *hadapan* sounds; e.g. آي (ai!), آولياء (*awlia*).

Hamzah is not strictly a letter of the alphabet; it belongs rather to the class of diacritical marks, and was probably developed from the head of the letter ع. Unlike *alif*, its only function is to represent the glottal plosive; it never serves as a vowel, nor is it ever used initially. In modern Jawi spelling it is used:

- (1) To replace ا in the middle of a word when *sa-* is prefixed to words beginning with *alif* and that *alif* is omitted: سئورغ (instead of ساورغ), سئيكور (instead of سايكور), سئوله (instead of ساوله). It should be noted, however, that this changing of ا into * on prefixing *sa-* is not done in all cases. Observe ساءمئام (*sa-um̐ama*), ساءيلوق (*sa-elok-elok*), ساءكان (*sa-akan-akan*), and many others.
- (2) To mark a consonant *alif* (a sounded *alif*) in order to prevent it being treated as a vowel; e.g. *alif* in words like داتس (*di-atas*), كاممئت (*kā-m̐m̐et*), ساءكان (*sa-akan-akan*), كاءدان (*kā-daan*), etc. where, without the *hamzah*, there is danger of the words being read *datas*, *kampat*, *sakan-sakan*, *kadana*, etc.
- (3) To replace ق which represents the glottal check closing a syllable at the end of a word. This is only done in certain stereotyped words where the sound of the syllables in question seems to be light or soft; e.g. داتوء (*dato'*), انچيء (*ēnche'*), ماء (*Ma'*); and also in words like كوكوء فوكوء where the use of ق would give the appearance of repeating too many letters of the same form. With certain other words ق and ا may be used interchangeably; e.g. يسوء or يسوق, ياموء or ياموق.

- (4) To mark a break or a slow change from an *atas* vowel-sound to a *bawah* or *hadapan* vowel-sound; e.g. بَايَكْت (baik), لَايِن (lain), لَاوَت (laut), دَاوَن (daun); and also occasionally to mark a change from *hadapan* sound to *bawah* sound: كُوِيَه (kueh), تُوِيَه (toeng), لُوِيَق (luek), etc., the object to ensure that the ي is a vowel ي, not a consonant ي. An abrupt change which produces the diphthongs *ai* and *au* is never marked by a *hamzah*.
- (5) To substitute one of two contiguous *alifs* in a compound word: e.g. سِتْيَاوَسَهَا (from سِتْيَاوَسَهَا), مَاءِئِنَغ (from مَاءِئِنَغ), يَاءِئِت (from يَاءِئِت or يَاءِئِت). In the case of اَيْت the *alif* is replaced by *hamzah* in the compound word مَرْيَكْنِيَت (mērcka itu); and in old MS. we also find رَاجِيَت (raja itu).

THE PRONUNCIATION AND SPELLING OF FINAL A.

An open *atas* syllable, which comes as the final syllable in a word, such as the last syllable in *gula*, *mata*, *kira*, *nganga*, etc., has no definitely fixed pronunciation as regards *halus* and *kasar*. It varies with different dialects. In some dialects it is pronounced nearly as *atas halus*, though of course entirely different from it; in others such as the Malay dialects of Penang and Province Wellesley and the Bazaar Malay employed as *lingua franca* among the cosmopolitan population of Malayan towns, such a syllable is pronounced exactly as *atas kasar* (as in the non-final position). But the pronunciation which makes it sound somewhat like *atas halus* (the Riau-Johor pronunciation as it is called) is the one generally recognised as the standard. It is so pronounced in Southern Malay (except among the descendants of the Minangkabau colonists of Negri Sembilan and Northern Malacca where it becomes more or less like *o*) and also in the dialects of all the native Malay population in the Eastern States of the Peninsula. But as thus pronounced, it must not be confused with the normal *ě*. It is longer and broader, and also usually lower in tongue position. Moreover, it is of different origin, being derived from a real *a*, while *ě* is in most cases not derived from any other sound but comes down as a distinct sound from the original common Indonesian mother tongue.

Like its pronunciation, the spelling also of such syllables (in modern Jawi) is not fixed. In some cases they are spelt with an *alif* as *huruf saksi*: e.g. كيرا (*kira*), كودا (*kuda*), سىغا (*singa*), باوا (*nyawa*), جالا (*jala*); while in some other cases such final syllables are written without the *saksi alif*: e.g. كيت (*kita*), تىگ (*tiga*), ماس (*masa*), نام (*nama*), راج (*raja*), گون (*guna*) سوك (*suka*) and so on. Of course, there is no causal connection between the matter of varying pronunciation described above and this irregularity in the use and non-use of final *alif* in the spelling. The latter is due to imperfect adaptation of the older spelling to the newer *huruf saksi* system, coupled with reasons affecting the individual words, e.g.:

- (a) After non-joining letters, especially و and ر, but also often د *alif* is usually written.
- (b) لا (*la*) is almost regarded as a single letter.
- (c) Such a spelling as سىغا (*singa*), with final *alif* avoids confusion with سىغ (*siang*); and there are other cases of the kind.
- (d) If the vowel of the last syllable but one is *ē* in an open syllable, final *a* is always represented by *alif*, such as كنا (*kēna*), فتا (*pēta*), دفا (*dēpa*). In modern spelling, the same is also usually done when the last syllable but one has *ē* in a closed syllable, e.g. دندا (*dēnda*), بندا (*bēnda*), سنجبا (*sēnja*), ترفا (*tērpa*); كرج and سرت are exceptions.

In any case, one rule in this matter appears to be definitely established by usage and observed in modern Jawi with tolerable regularity; namely, that *whenever final syllables of this particular description are made up of any one of the letters د ر غ ل و they must, with one or two exceptions, be accompanied by the vowel whatever the preceding syllable may be*; e.g. لادا (*lada*), لندا

(landa), بلیدا (bēlida), ریندا (renda), رودا (roda), توندا (tunda), ردا (rēda), بندا (bēnda); and so on with the other four letters after *dal*.

As to the non-use of *alif*, one general rule has been regularly followed by all scholarly writers of to-day, viz: *All words of the a + a type, when both the syllables are open should be written with ۱ for the first syllable only, unless the second (last) syllable comes under the above rule of و ل غ ر د when it too should have the saksi ۱*. E.g. اڤا (apa), باڠ (bacha), باڤا (bapa), تان (tanya), مان (mata), مات (kata), سان (sana), سام (sama), راج (raja), باک (baka), راس (rasa), نام (nama), بات (nyata), لاب (laba), لاڠا (nganga), بارا (bara), لادا (lada), جالا (jala), باوا (bawa).

For the rest, it is difficult, perhaps impossible to lay down any rule, except perhaps:

- (a) When the final syllable is made up of the consonant ك or گ no *alif* should generally accompany it.
- (b) Words like كيت (kita), ليم (lima), گون (guna), كوت (kota), همب (hamba), هرت (harta), روف (rupa), چنت (chinta), سرت (sērtā), كرج (kērja) and many others, are survivals of the old *baris* system which, having become fairly established, seldom gave rise to confusion and hence did not have the need of being altered.

Many other rules might be enunciated which govern various aspects of modern Jawi spelling as seen in popular practice. But these I hope to deal in a separate paper. I am much indebted to Dr. Blagden for valuable and illuminating criticisms, which have been incorporated here, though he is in no way responsible for my article in its final shape.

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Part I.—General.

By CEDRIC DOVER.

In 1924, Mr. Frank Morton Jones of Wilmington, Delaware, whom I had met in London, presented me with a set of his papers on the fauna and bio-chemistry of pitcher-plants. I had always wondered if the pitchers of *Nepenthes* and its allies contained a distinctive fauna other than the prey required for the nourishment of the plant, and Mr. Jones's observations showed me that the pitcher-plants not only had a fauna of their own, but in many respects a very remarkable one.

When I returned to India in 1925, I found no opportunity for studying the magnificent *Nepenthes destillatoria* of Ceylon, or the *N. khasiana* of the Khasi Hills, but on coming to Singapore I was pleased to find that I could collect the pitchers of at least three species not very far from the town. I have not been able to study the fauna of these plants over an extended period, but I nevertheless feel that the results of my collecting are worth publishing, if only to interest others in a fascinating subject. This first part contains a general account of our knowledge of the fauna of pitcher-plants, and for it no originality is claimed: a recapitulative account, is, however, necessary, especially for interested amateurs who have very little access to literature, if the subject is to be properly appreciated.*

* Mr. Dover's study of pitcher-plants was made while he held a temporary appointment in the Raffles Museum, Singapore. I am indebted to Mr. R. E. Holttum, Director of Gardens, S.S., for assistance in obtaining material and for some of the photographs used in illustrating this series of papers; and to the systematists who have been good enough to report on the *Nepenthes*-fauna. C. Boden Kloss, Director of Museums, S.S. and F.M.S.

The Pitcher-Plants.

Among the most curious of the insectivorous plants, the pitcher-plants are found in both hemispheres. In the New World Sarraceniaceae which are bog plants, the entire leaf has become a pitcher with a terminal lid or bilobed flap: three genera and nine species are known. The Old World Nepenthaceae are much richer in species, some seventy species of the sole genus *Nepenthes* having been recorded, and according to Ridley (1924) sixty-five of these are found in the Malay Peninsula and islands, one species each being known from Madagascar, Ceylon, India, Australia and Polynesia. The family has its headquarters in Borneo, with Mount Kina Balu as a centre, and the extreme lightness of the seeds together with a relatively large surface of exposure to wind is very favourable to wind-dissemination, which naturally leads us to suppose that this is the main cause of the distribution of the species in a radial manner from Borneo. The Nepenthaceae are distinguished from the Sarraceniaceae by the fact that in them the mid-rib is prolonged beyond the lamina of the leaf, bearing at its end the pitcher: the entire leaf is not converted into a pitcher. The Malays, (*cf.* Ridley, 1924) call the pitcher-plants *Priok Kra* or Ape's Cups, an illustration of the natural alertness of the primitive mind, as monkeys are known to drink the water from the pitchers, and in the Raffles Museum, there is even what is reported to be a "nest" of the Crab-eating Macaque (*Macacus irus*) composed almost entirely of the pitchers of *N. gracilis*.

In Singapore four species of *Nepenthes* occur. *N. ampullaria* Jack, which may be readily known by its small, globose pitchers, which at the base of the plant are huddled together in large whorls buried in the ground (pl. XVIII); *N. gracilis* Korth., which has pale green, cylindric pitchers, about $3\frac{1}{2}$ " long and 1" through (plate XIX); *N. rafflesiana* Jack, which has broad, ampullaria-like pitchers, thickly blotched with red at the base of the plant, the upper pitchers being funnel-shaped and about eight to nine inches long (plate XX); and *N. phyllamphora* Willd., in which the pitchers are cylindric and slightly dilated at the base. The last species is the most widely distributed of the three, extending to S.E. China and New Guinea with close relatives in Australia; the others have a more restricted range. The first three forms are found in wet spots towards the edge of fairly thick jungle; *N. gracilis* and *N. ampullaria* are very common in the jungle surrounding the Thompson Road Reservoir in Singapore, where my collections were made, and *N. rafflesiana* is also found there, though not so abundantly, (pl. XXI).

The general principle of the insect-trap in pitcher-plants is well known. In *Nepenthes* the insects are attracted to the pitchers by the honey which is exuded from glands at the rim and on the under surface of the lid, which is usually brightly coloured to attract the attention of insects. Strangely enough these glands

are absent in the lid of *N. ampullaria* in which it is distinctly atrophied and thrown back horizontally, away from the mouth of the pitcher, so that any sweet secretion on it would tend to lure insects away from the pitcher instead of into it. I have observed, however, that the lid of *N. ampullaria* is not without a definite function in the economy of the plant, as it provides a convenient base on which insects alight, and are then lured into the pitcher.

From the mouth of the pitcher there is a smooth, conducting surface, which precipitates any insect which has stepped on it to the bottom of the pitcher, which is entirely occupied with the secretive surface. This secretive surface consists of a cellular floor with masses of cells imbedded in the tissue and surrounded by a semi-circular guard ring, forming a kind of projecting epidermal "roof." The mouth of each cell is directed downwards so that the secreted fluid falls to the bottom of the pitcher. It is these glands and their secretion which cause the final capture and digestion of those insects which have ventured into the pitcher. There is no detentive surface of downwardly-directed hairs as in *Sarracenia*. If the insects attempt to escape by climbing up the inner wall of the pitcher, they come under the roof of a gland, and at the same time come in contact with the gland itself, and adhere to it. The real pitcher liquor is not very abundant, and the fluid which fills about half of the pitcher is largely rain-water.

With so specialised an arrangement to secure its food, it is inevitable that a corresponding specialization would take place among the organisms which come in contact with them to evade, and even to utilize, these traps to their own advantage, for food is provided here in plenty by the numerous captures of the pitcher. It is this aspect of the relation of arthropods to pitcher-plants which is specially interesting.

Chemistry of the Pitcher Liquor.

The pitcher liquor from unopened pitchers is a clear, colourless fluid with a pleasing taste, and an acid reaction to litmus; that from opened pitchers is of a clear yellowish colour, but in some old pitchers it is a deep golden brown, syrupy liquid in which no living organisms could survive. Apparently no strong poisonous substance exists in the liquor, as monkeys are known to drink the water from the pitchers, and many observers, notably Wallace in his *Malay Archipelago*, have related how they have been compelled to quench their thirst from these natural jugs.

Free volatile acids are absent from the liquor, the chief organic acids being malic acid and a little citric acid in the combined proportion of about 39%. The chief solids in the fresh pitcher liquor are said to be potassium chloride, about 50%, sodium oxide, nearly 6%, calcium oxide, about 2½%, and magnesium oxide, about 2½%.

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The work of many investigators on the bio-chemistry of the pitcher liquor (summarised and extended by Hepburn, St. John and Jones, 1919, 1920) definitely proves the presence of a digestive enzyme, which Vines has named *Nepenthin*, and that *Nepenthes* possesses a true digestive process. This enzyme is stimulated in the open pitchers by the increase of acid brought about by the capture of insects, and then exerts a very active digestive influence. That the digestion is not due entirely to bacterial influence, as was supposed by Dubois and Tischutkin, has been proved by Hepburn and St. John (1919, c) who found that the liquor taken aseptically from unopened pitchers was absolutely sterile, though liquor taken from active opened pitchers containing insect remains, had a bacterial count of from 48,000 to 8,000,000 per c.c., the organisms being rod-bacteria (*Bacteriaceae*). The bacteria live symbiotically with the pitcher-plant, deriving their nutrition from the digested insects, and assisting slightly in the digestive processes of the plant. The bacteria, therefore, play only a secondary role in the digestion of the *Nepenthes* captures, the leading part being played by the protease in the pitcher liquor.

We see, therefore, that the organisms ordinarily found living in the fluid of the pitchers, are living in a fluid containing both proteolytic enzymes and bacteria, capable of dissolving all but the chitin of large adult insects, such as beetles and ants. This would suggest the occurrence in these organisms of antiproteases (antipepsin and antitrypsin), as is the case in the intestinal worms of man and domestic animals, to safeguard them from the action of the protease. Hepburn and Jones (1919, d) have proved the occurrence of antiproteases in the larvae of *Sarcophaga sarraceniae* Riley, a habitual inmate of *Sarracenia flava*, and further work along the lines indicated by them would be most interesting.

The Organisms Captured by Pitcher-Plants.

The organisms captured by pitcher-plants belong to many zoological groups, and vary considerably in size. The common prey are, of course, insects, all the major orders being represented, but spiders, scorpions, centipedes, millipedes, and even small mammals and birds are known to have been captured by *Nepenthes*. The mass of semi-digested matter found at the bottom of any active pitcher consists mainly of the remains of ants, this being true also of the species occurring in Singapore, especially *N. gracilis*. In one old pitcher of *N. rafflesiana* the base was packed for two inches with the remains of ants, and in it I also found specimens of the large *Camponotus gigas* (a species over one inch in length), and a scorpion over two inches in length. In Mr. Overbeck's list of the ants of Singapore (*Journ. Malayan Br. Roy. As. Soc.* III, 1925, p. 25 et seq) twenty-two species are recorded as having been taken in *Nepenthes* cups. Plate XXII

illustrates the diversity in size and kind in the captures of the three species of *Nepenthes* which I have studied in Singapore.

Previous work on the fauna of Pitcher-plants.

Perhaps the most important ecological study of *Nepenthes* is that of Guenther (1913 and 1915). The author has made an extensive study of the Ceylonese *N. destillatoria*, and has listed the organisms obtained from it in his paper. The most interesting of the insect associates discovered by Dr. Guenther is a species based on the pre-imaginal stages, which he describes as *Nepenthophilus tigrinus* n. gen. et sp., believing it to belong to the order Trichoptera, but Mr. F. M. Jones, who is a specialist on the Psychidae, informed me that he considered it to be a Psychid.

Next in importance is Jensen and de Meijere's study of the dipterous associates of *Nepenthes* in Java (1910). Dr. Jensen mainly discusses the results of experiments with pepsin and pancreatin on the larvae, and Dr. de Meijere gives a systematic account of the Diptera, which include five species of Culicidae, two of Phoridae, and one of Anthomyiinae. The mosquitoes known to occur in *Nepenthes* are listed by Edwards (1923). Eight of the sixteen species listed by him are from the Malay Peninsula, and it is unfortunate that he does not give the specific names of the plants from which they were obtained. The biology of *N. melampophora* in Java has also been studied by Heinricher (1906), van Oye (1921) and Menzel (1922). I have not been able to consult the work of the first two authors, but I have seen Menzel's paper which is chiefly an account of the Nematode fauna.

These studies represent practically all that is known of the associates of *Nepenthes*, except for a few stray references which are brought together in them.

The most interesting work on the Sarraceniaceae is that of Jones (1921). In this fascinating paper he describes the life-history of three Noctuid moths of the genus *Exyra*, whose natural food-plant is the *Sarracenia* species. These moths display remarkable adaptations to their dangerous habitat, especially in the larval stages. The connection between these moths and the *Sarracenia*s is a very ancient one, and Mr. Jones is inclined to believe that the three species have arisen by the inheritance of small variations in response to their peculiar environment. It would seem that every zoologist who combines a first-hand knowledge of the ecology of the organisms he studies as taxonomist, invariably comes to the conclusion that the inheritance of small, advantageous variations is a very pronounced factor in evolution. In so different a study as the evolution of shell-sculpture in certain aquatic molluscs of the family Viviparidae the late Dr. Annandale advanced the same opinion (*Proc. Roy. Soc. B.* 96, pp. 60-76, 1924), and though he has been criticised for his views (Huxley, Pt. III, 1928] *Royal Asiatic Society*.

Nature, April 17, and June 7; replies in the same journal, May 17, and July 5), I could not in any other way account for the differences in the blue-banded anthophorid bees (*Entomologist*, LVII, 1924, pp. 226-232).

The Culicid, *Wyeomyia smithi* Coq., affords another remarkable adaptation to life as a *Sarracenia* associate. This species lays its eggs in the pitchers, even when they are dry, hatching in this case being deferred till the pitchers refill with water.

In the plant world it is not only the pitcher-plants and their relations which have an interesting and diverse fauna. The leaf bases of the Bromeliaceae contain an even more varied fauna, which according to Scott (1914) includes most groups of the Invertebrata and even vertebrates such as batrachians. Adaptations to environment are also displayed in this fauna, some of its members having special means of holding on to the plant in case of storms, while others, like the mosquito larvae found in pitcher-plants, can survive temporary dessication. One of the most remarkable members of the *Bromelia* fauna is a *Syrphid* larva possessing ventral suckers, a phenomenon paralleled in the insects of fast-flowing streams.

The Fauna of Pitcher-plants in Singapore.

It is not necessary to discuss the fauna of pitcher-plants in Singapore in any detail in this note, as systematic accounts of my collections follow. Culicid larvae are, of course, the most abundant among the insect associates, but a minute thread-like worm, which does not appear to belong to either of the Nematode families Anguillidae or Mermithidae, though the Anguillidae have been recorded by Menzel (1922) from *N. melamphora* in Java, is the most common organism, especially in the pitchers of *N. ampullaria*, and the lower pitchers of the other species. A small Noctuid lives on *N. rafflesiana*, and the larvae live and pupate on the smooth conducting surface within the pitcher, the moth nearly always escaping unharmed, as I have often found the empty pupal cases within the pitchers, but never a specimen of the adult moth. In the limited time at my disposal I have not been able to study the associates of *Nepenthes* long enough to say with certainty if this moth is an exclusive associate of *Nepenthes*, as the *Exyra* moths are of the *Sarracenia*s but the evidence would seem to indicate a regular association, and the presence of a moth in one of the Old World Pitcher-plants provides an interesting parallel deserving of further study.

The most curious of the *Nepenthes* associates is a small red spider, which is attracted to *N. gracilis* by the insect-remains in the pitcher. It is commonly found in the secretive surface of the pitcher, entirely unharmed by the secretion. It runs up and down this gland-studded area with apparent ease, and when approached

retreats right into the base of the pitcher, regardless of the presence of water, from which situation it is extremely difficult to dislodge it.

The microscopic fauna is interesting and diverse, and contains various Diatomaceae, several Protozoa including *Paramaecium*, some Rotifera, and a small mite which is particularly abundant.

Bibliography.

1906. Henricher, E: Zu Biologi von *Nepenthes*, speziell der javanischer *N. melamphora* Reinw.—Ann. Jardin Bot., Buitenzorg, XX.
 1908. MacFarlane, J. M; *Nepenthaceae*: in Engler, Das Pflanzenreich, IV, iii, pp. 1-92. Leipzig.
 1908. MacFarlane, J. M; *Sarraceniaceae*: in Engler, Das Pflanzenreich, IV, 110, pp. 1-38. Leipzig.
 1910. Meijere, J. C. H. de; *Nepenthes*—Tiere, I. Systematic—Ann. Jardin. Bot. Buitenzorg, 3 Suppl., part I, pp. 917-938, pls. XLIX-LII.
 1910. Jensen, H; *Nepenthes*-Tiere, II. Biologische Notizen—*ibid.*, pp. 941-946.
 - 1913, 1915. Guenther, R; Die Lebenden Bewohner der Kannen der Insektenfressenden Pflanze *Nepenthes distillatoria* auf Ceylon—Zeits. für Wiss. Insektenbiologie, IX, pp. 90-95, 122-130, 156-160, 198-207, 259-270, and XI. pp. 241-243.
 1914. Scott, H; The fauna of "Reservoir Plants"—*Zoologist* (4), XVIII, pp. 183-195.
 1919. Hepburn, J. S.; St. John, E. Q.; and Jones, F. M.; Biochemical studies of Insectivorous Plants—Contributions from the Botanical Laboratory of the University of Pennsylvania, IV, No. 2. (Contents: *a* The Work of previous Investigators on *Nepenthes*—Hepburn; *b* A Study of the Protease of the Pitcher Liquor of *Nepenthes*—Hepburn, *c* A Bacteriological Study of the Pitcher Liquor of *Nepenthes*—Hepburn and St. John; *d* Occurrence of Antiproteases in the larvae of the Sarcophaga associates of *Sarracenia flava*—Hepburn and Jones.
 1920. Hepburn, St. John, and Jones; The Absorption of Nutrients and Allied Phenomena in the Pitchers of the *Sarraceniaceae*—*Journ. Franklin Institute*, 189, No. 2, pp. 147-184.
 1921. Jones, F. M.; Pitcher-Plants and their Moths—*Natural History*, XXI, No. 3, pp. 296-316.
- Pt. III, 1928] *Royal Asiatic Society*.

1921. Oye, P. van; Zu Biologia der Kanne von *Nepenthes melamphora* Reinw.—Biolog. Centrabl. Bd. 41.
1922. Menzel, R.: Beiträge zur Kenntnis der Mikrofauna von Niederländisch-ost-Indien. ii. Über den tierischeu Inhalt der Kannen von *Nepenthes melamphora* Reinw. mit besonderer Berücksichtigung der Nematoden—Treubia III, pp. 116-122.
1923. Edwards, F. W.; Mosquito Notes, IV—Bull. Ent. Res., XIV, pt. 1, p. 1.
1924. Ridley, H. N.; The Flora of the Malay Peninsula. III, Apetalae, pp. 20-25. London.

Explanation of Plates.

PLATE XVIII.

The Pitchers of *Nepenthes ampullaria* Jack. are commonly found in whorls on the ground. An upper pitcher may be seen on the right hand side of the photograph. Notice the small, backwardly directed lid.

Photo. by R. E. Holttum.

PLATE XIX.

Nepenthes gracilis Korth., is a slender plant with cylindric pitchers.

Photo. by R. E. Holttum.

PLATE XX.

Upper pitchers of *N. rafflesiana* Jack. The ground form pitchers are broad and squat, but may always be distinguished from *N. ampullaria* by the shape of the lid.

Photo. by Cedric Dover.

PLATE XXI.

The species of *Nepenthes* are generally found in situations such as this. The black, elongated objects are the pitchers of *N. gracilis*.

Photo. by R. E. Holttum.

PLATE XXII.

Captures from three pitchers of *N. rafflesiana*, two of *N. gracilis* and two of *N. ampullaria*. The masses of partially digested matter are not included. The centipede, the scorpion, the large ant (*Camponotus gigas*), the coreid bug, the elaterid beetle











on the extreme upper right hand side and the pompilid wasp below it, are from *N. rafflesiana*, as are also some of the smaller ants. The insects on the lower half of the picture are mainly from *N. gracilis* and *N. ampullaria*, and include an Isopod, a Blattid, two or three spiders, some neuropterous insects, two Homoptera, a small beetle and many ants.

Photo. by Cedric Dover.

Part II.—Pepsin Resistance in the Culicid Larvae.

By CEDRIC DOVER.

It will be seen from the previous part in this series that the fauna of *Nepenthes* is remarkable in that it is living in a fluid containing a proteolytic enzyme and bacteria, from which we may reasonably suppose that its members are fortified by antiproteases, as are the intestinal worms of the mammalia. Indeed, Hepburn and Jones have definitely proved the occurrence of antipepsin antitrypsin in the larvae of *Sarcophaga sarracenia* Riley, an associate of *Sarracenia flava*, and Jensen has noted the resistance to digestive fluids of larvae from *Nepenthes* in Java.

In the course of my study of the fauna of pitcher-plants on Singapore Island, I attempted some experiments to ascertain if possible the nature of the resistance to the digestive action of the pitcher-liquor on the part of the various Culicid larvae which occur in the pitchers of *Nepenthes* there. The Culicid larvae used for the experiments were taken from pitchers in which there was a minimum of rain water, and the activity of the fluid was determined by the fact that Culicid larvae obtained from stagnant water could survive in the pitcher-fluid for only a few hours, being almost completely dissolved in three or four days. A fairly large flake of fibrin introduced into the pitcher-fluid was found at the end of four hours to be completely dissolved.

In the beginning it was my intention to follow the technique of Hepburn and Jones, but lack of adequate biochemical facilities soon showed me that my experiments would have to be of the simplest nature. As Hepburn and Jones' paper is not easily obtainable, a short summary of their technique might be useful to investigators who wish to pursue this subject further. In Hepburn and Jones' most important experiment a number of larvae weighing 8.30 grams were ground with glass powder to an intimate mixture which was triturated with distilled water. This mixture was subjected to a pressure of 50 kilograms per square centimeter in a Buchner press, and a quantity of press juice was obtained. In the test for antipepsin 12 c.c. of this press-juice, and 12 c.c. of a freshly prepared 0.2 per cent aqueous solution of pepsin, were mixed and allowed to stand at room temperature for 30 minutes.

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to permit the pepsin and the antipepsin to combine. Sufficient hydrochloric acid (2 per cent) and trikresol (2 per cent aqueous solution) were then added to make the concentration of each 0.2 per cent in the resulting solution. A control experiment was carried out in exactly the same manner, except that the press-juice was replaced by distilled water. A little carmine fibrin (0.2 gram) was added to both the experiment proper and the control, and the time it took to dissolve in the two mediums was noted. It was found that in the control the carmine fibrin was dissolved in 45 minutes while in the experiment proper it took 17 hours. In the test for antitrypsin the technique was similar, except that a 0.2 per cent aqueous solution of pancreatin was used, and the hydrochloric acid was replaced by sodium carbonate, a sufficient quantity of a 4 per cent solution being added to make the final concentration 0.4 per cent in the final solution. The same amount of the bactericide, trikresol, was added as in the previous experiment. The test then proceeded as previously, and it was found that the carmine fibrin in the control was completely dissolved in 14 hours, while that in the experiment proper took 22 hours to dissolve.

In the first of my own experiments a small Culicid larva from *Nepenthes ampullaria* was placed in a 0.2 per cent pepsin aqueous solution, made active by the introduction of 0.2 per cent HCL. It lived for about 12 hours, and at the end of 16 hours was rather pale and translucent, digestion having begun. A larger Culicid larva from stagnant water placed in a similar medium died at the end of three hours, and at the end of 16 hours was very soft and flaccid, digestion being fairly well advanced. A similar experiment repeated with a 0.2 per cent active aqueous solution of pancreatin gave a totally different result. The larva from *Nepenthes* lived for five days, while that from stagnant water was still active when the *Nepenthes* larva had died. These experiments were repeated several times with more or less similar results.

The evidence from these crude tests indicated that Culicid larvae from *Nepenthes* showed a distinct resistance to pepsin, and not to pancreatin, the digestive action of which is normally very much slower than that of pepsin.

In the second series of experiments 18 full-grown larvae of *Megarhinus immisericors* Leic., which I found in the larger pitchers of *N. ampullaria* and *N. rafflesiana* were thoroughly ground with glass powder to an intimate paste, diluted with 25 c.c. of distilled water and filtered. Five c.c. of the larval filtrate was mixed with 5 c.c. of active 0.2 per cent pepsin solution, and a small flake of fibrin inserted in it. A control experiment was also started with the larval filtrate replaced by 5 c.c. of distilled water. In the control bottle the fibrin flake, which was larger

than that in the other bottle, was completely dissolved in an hour, while the fibrin in the experiment proper, was not dissolved at the end of 48 hours, taking 4 days to be completely dissolved and, as I could not add a bactericide to the pepsin solution, the presence of bacteria must have facilitated its digestion. This experiment was repeated three times: in each case the fibrin in the experiment proper took nearly 4 days to dissolve, while that in the control was dissolved in less than 2 hours. The experiment was also tried with a small cube of boiled egg-white, and here again the egg-white took very much longer to dissolve in the experiment proper than in the control.

A similar series of experiments were also performed with pancreatin as a medium, with results which bore out the conclusions from the first experiment. Five c.c. of a 0.2 per cent pancreatin solution made active by the presence of 0.4 per cent sodium carbonate, was mixed with 5 c.c. of the larval filtrate, and a small flake of fibrin was inserted in the resulting solution. A control experiment was carried out with the larval filtrate replaced by distilled water. The fibrin flake in both the experiment proper and the control was introduced at 5 p.m. on 13.V.26. At 12 a.m. on 15.V.26. the fibrin in the experiment proper was completely dissolved, the solution being full of bacteria, while that in the control was still present, though partially dissolved. The experiment was repeated at 1 p.m. on 15.V.26. The fibrin in the experiment proper was completely dissolved on the morning of 18.V.26, while that in the control was still present, and by no means in an advanced stage of digestion. The experiment was repeated again on three occasions with similar results, boiled egg-white also being dissolved more quickly in the experiment proper than in the control.

These experiments though not so conclusive as those of Hepburn and Jones lead me to the tentative conclusion that the Culicid larvae occurring in *Nepenthes* contain an antiprotease-antipepsin, but that antitrypsin does not appear to be present in them, at any rate in a marked degree. This may be expected, as the protease of the pitcher-liquor of *Nepenthes* is closely allied to pepsin and not to trypsin. That an antitrypsin should occur in the larvae of *Sarcophaga sarracenia* seems to be natural, as it comes of a family in which the larvae are parasitic, and we might expect them to be fortified by antitrypsin as are the intestinal worms, such as *Ascaris*.

An interesting point in connection with this work is that the larvae which were used in these experiments belong to common species found in habitats other than that of the pitchers of
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Nepenthes. In the species of *Megarhinus*, for instance, of which one was used in the second series of experiments, the larvae are apparently capable of living in an unfavourable environment for prolonged periods, Green recording that *Toxorhynchites* (or *Megarhinus*) *immisericors* Walk. lived for several hours in 4 per cent formol, and I have kept *M. acaudatus* alive in very weak iodine solution and in strong pepsin solution. One larva in the latter solution, not only survived for several days, but eventually pupated and hatched out. This mosquito is quite harmless, and the larvae are extraordinarily voracious, their normal food being the larvae of other mosquitos. This fact should be suggestive to those interested in anti-malarial measures.

The results of my experiments therefore suggest that many Culicid larvae contain a potential pepsin resistance, which is developed in the presence of pepsin. If this is so we have here a remarkable case of latent power to protect themselves against an adverse environment in Culicid larvae, and indicates that environment is a powerful factor in altering the constitution of an organism.

While I personally believe that the Culicid larvae in *Nepenthes* contain anti-pepsin, in the light of our present knowledge this theory must be treated with some reservation, as the presence of neutral salts in the tissues of the larvae might possibly retard peptic digestion. I, therefore, hope that this note will interest a biochemist sufficiently to induce him to study the question in greater detail. In further work a larval filtrate from larvae of the same species as that found in *Nepenthes*, but taken from fresh or stagnant water, should be used as a control instead of distilled water. Unfortunately, I have not been able to obtain the larvae of *M. acaudatus* from situations other than the pitchers of *Nepenthes*, and must leave this point for a future occasion, or for some other observer.

In concluding I must express my indebtedness to Mr. Norman Smedley, Assistant-Curator, Raffles Museum, for his interest and co-operation in the experiments while they were in progress.

Bibliography.

- 1905. Green: Spoila Zeylanica, II, p. 101.
- 1910. Paiva: Rec. Ind. Mus, V, p. 187.
- 1910. Jensen: Ann. Jard. Bot., Buitenzorg, 3rd suppl., part 1, p. 941.
- 1919. Hepburn & Jones: Contributions Bot. Lab. Univ., Pennsylvania, IV, No. 2, p. 400.
- 1926. Cole: Practical Physiological Chemistry, 7th ed., Cambridge, 1926.

Part III.—Batrachia.

By CEDRIC DOVER.

Among the more interesting constituents of the *Nepenthes*-fauna in Singapore are certain very young batrachian larvae taken in the fluid of the ground pitchers of *Nepenthes ampullaria* at the Kalang-Reservoir on May 9, 1926. One of these larvae was kept in the pitcher-fluid in a glass jar, but it died in three days; another was kept in fresh water with the merest trace of iodine, as it was thought that this would facilitate development, but this larva also did not survive for long. A third tadpole was kept in fresh water and fed on bread. It lived for about ten days, its hind legs being observed on the fourth day, but unfortunately it died during a museum holiday, possibly because the water had become foul. These larvae were too immature to permit of a certain specific identification, but they almost certainly belong to the Bufonidae, possibly to *Bufo melanostictus* Schneider, a very common local toad, to which they approximated most closely according to Flower's excellent description of the tadpole (Proc. Zool. Soc. 1896, p. 911, pl. xlv, fig. 3). Dr. Malcolm A. Smith to whom the specimens were sent was unable to identify them owing to their immaturity, but agrees in thinking that they belong to a *Bufo*. It seems certain that these larvae only spend their earliest stages in the pitchers, and that when they grow to a size when the small pitchers of *N. ampullaria* are unable to accommodate them comfortably they transfer themselves to water near by. That batrachian larvae are capable of resisting fairly prolonged immersion in the pitcher-fluid is, however, very remarkable, and constitutes a novel habitat for the group.

Part IV.—Araneae.

By LOUIS FAGE, D. Sc.,

Museum National d'Histoire Naturelle, Paris.

(translated by MRS. C. DOVER.)

Misumenops nepenthicola (Pocock)

Description: ♀, total length 6 mm.; length of cephalothorax 2.5 mm. **Color.** (in alcohol): cephalothorax tawny testaceous red, ocular area yellowish; abdomen dull red with lighter spots irregularly placed; sternum, coxae and abdomen shining, legs uniformly reddish, the anterior pair a little darker.

Cephalothorax a little longer than wide, thoracic part almost flat, cephalic part more projecting. Frons distinctly lower than the ocular area. Group of median eyes a little wider than long and less straight in front than behind; tubercles of lateral eyes

rounded, the anterior ones separated from the posterior by a well-marked depression, not reaching their base; the two ocular lines recurved, the anterior more feebly than the posterior, anterior eyes equidistant, the laterals a little larger than the medians; posterior eyes equidistant, the laterals a little larger, of the same diameter as the anterior medians.

Legs (I=14 mm.; II=12 mm.; III=7.5 mm.; IV=8.5 mm.;) armed with numerous spines: a dorsal spine on the bases of all the femora, also on the 1st. femora a series of 4—5 anterior basal spines and one situated distally; knees provided with two spines dorsally—a basal and a distal; 2 spines dorsally and 4 pairs ventrally on 1st. and 2nd. tibiae, and 2 lateral anterior spines on 1st. tibiae; 3rd and 4th tibiae with 2 dorsal spines, but only 3 ventro-anteriorly, and on 4th. tibiae a ventro-posterior one; all metatarsi armed with an anterior spine on basal third, the first and second metatarsi with 4-5 long ventral spines in two series, with 2 ventro-anterior ones on the 4th metatarsi: tarsi unarmed, the anterior half, the posterior one-third, shorter than the metatarsi.

Abdomen gradually enlarged apically with posterior border rounded. Epigyne: Fig. 1.

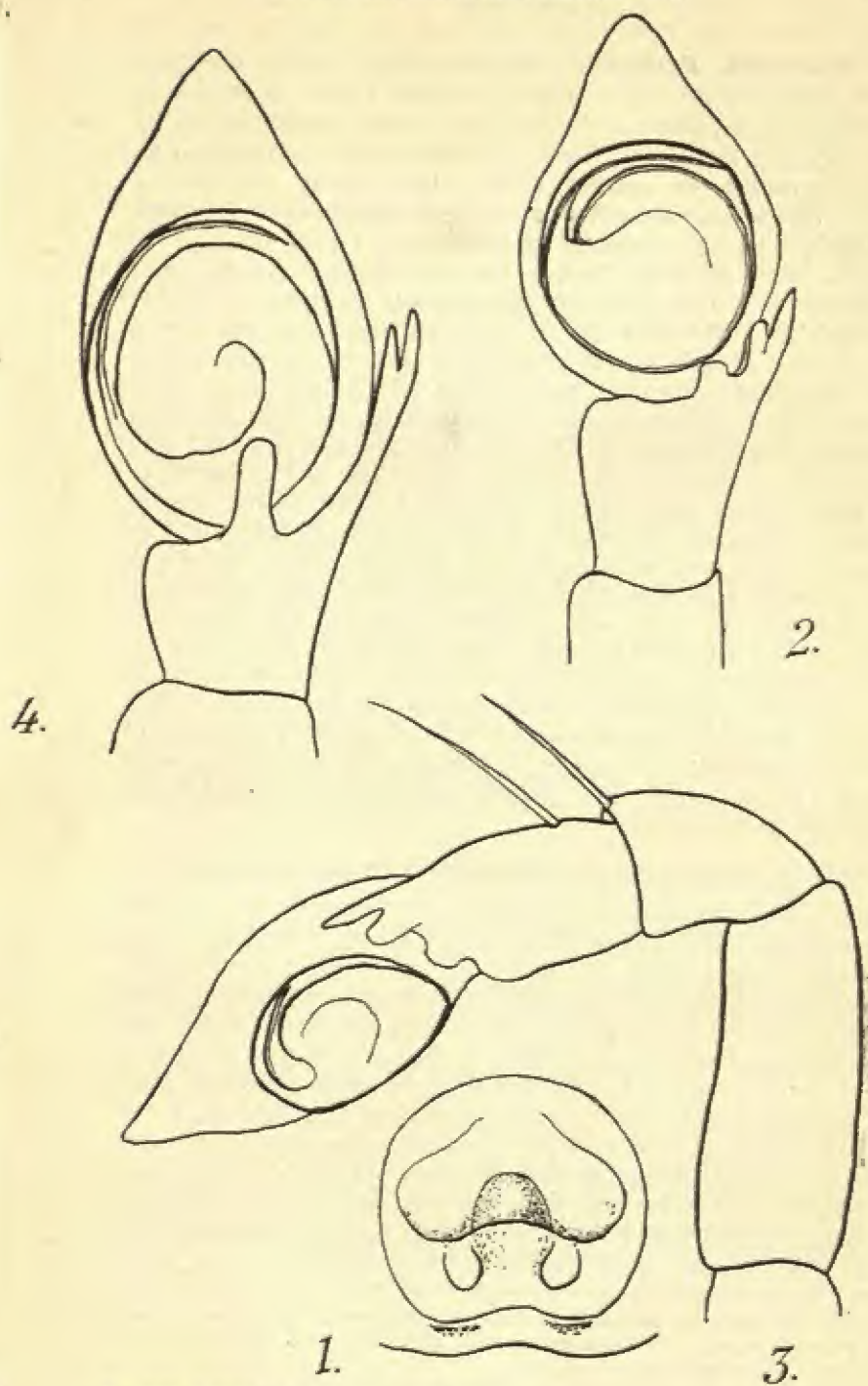
♂. *Length* 3 mm., length of cephalothorax 1.5 mm.

Colour (in alcohol): cephalothorax, abdomen and venter tawny testaceous reddish, femora of the same colour, knees, tibiae and metatarsi dull red, tarsi lighter.

Spines on the legs slenderer and longer than those of the ♀, but similar placed: 4 dorsal spines on the 1st and 2nd femora; 5 and 6 respectively on the 3rd and 4th femora.

Mandibular palp (figs 2, 3) light yellow, knee and tibia each armed with a long dorsal spine. Superior external apophysis of the right tibia as long as half the joint, thick at the base, bifid extremity, the external point sharp and a little longer than the internal one; ventral apophysis scarcely as long as wide, less pointed and equally truncated at the tip. Discoidal bulb surrounded by a black stylus.

Habitat: Singapore: in the pitchers of *Nepenthes gracilis* Korth; ♂, ♀ and young ones collected by Mr. Cedric Dover; Borneo (Labuan) in the pitchers of *Nepenthes* sp., ♂, ♀, and young ones (Pocock).



Taxonomic Remarks. This species has already been sent from Borneo (Labuan) to Pocock, so that I have been able to examine the specimens in the British Museum, kindly sent me by my colleague Dr. Hirst. This was necessary since Pocock in an article recording its capture (*Nature*, 1898) merely mentions the spider (*Misumena nepenthicola*), without describing it.¹ In providing the above description of the species, I have retained the specific name given by Pocock, but transferred it to the genus *Misumenops*. The genus *Misumenops* was proposed by F.O.P. Cambridge² (1905) for the intermediary species of the genera *Diaea* and *Misumena*. Its creation is due to the uncertainty of taxonomists regarding the position of the numerous forms which, though having the facies of *Misumena*, resemble the *Diaea* in their tarsi being shorter than the metatarsi and provided with two series of hairs; in the relative dimensions and armature of their legs which are furnished with lateral spines on the anterior femora, tibiae and metatarsi; in the position of their anterior eyes in a less recurved line than the posterior ones. But whilst the rounded tubercles which bear the lateral eyes are widely separated in the *Diaea* and completely fused in the *Misumena*, they are here separated by only a slight depression which does not isolate their bases. Besides, Thorell and E. Simon have already described the intermediary forms between the two genera, which justifies Pocock's proposition, but it is probably a question of artificial splitting, convenient to taxonomists, and whose only merit is to show the proper relationship which unites *Diaea* with *Misumena*.

As the latter genus is represented in America, Europe and Asia, it not surprising that the genus *Misumenops* has the same distribution. If it has not been mentioned up to that date from America—where there are about 34 species—it is because the American authors following Cambridge, are the only ones to have withdrawn the intermediary forms from the genus *Diaea* and *Misumena*. However, E. Simon, in 1895, noted that *Misumena tricuspidata* Fabr. of Europe and Asia, occupied an unique place in the genus, and in the still unpublished M.S. of Volume IV of the *Arachnids of France*, he has placed it among the *Misumenops*. It is probably to this genus that *Misumena dierythra* Thorell from Singapore and *Misumena decolor* Kulcz from Ghinda (Eritrea) belong, and which are not without analogy with the species we have just described, but whose females alone are known.

1. Dr. Fage has particularly requested that this species should stand in Pocock's name, so I have, reluctantly, connived at an infringement of the rules of nomenclature. C.B.K.

2. *Biologia Centrali Americana*, Arachn. II, p. 141.

In the absence of any other terms of comparison we can see (Fig. 4) how far, by the structure of the legs of the male, *Misumenops nepenthicola* resembles *M. tricuspidata*: the position of the apophyses is identical and there is little essential difference.

Biological Remarks. The specimens that Pocock had before him came from Labuan (Borneo) and were found, according to the collector, exclusively in the pitchers of a single species of *Nepenthes*, although there are no less than about 20 species in Borneo. This *Nepenthes* unfortunately could not be identified with certainty on account of the bad condition in which it arrived in London. Pocock suggests that it might perhaps have been *N. phyllamphora* Wild., of wide distribution, but Mr. Dover thinks that it must have been *N. gracilis* which is apparently similar in form to *N. phyllamphora*, and also occurs in Borneo. As for the spider, it was found in the interior of the pitcher, a little below the peristome, where it weaves a light web, which assures the liberty of its movements on the steep, slippery walls. Both sexes were caught there, and the following season the eggs and the young. When the female is disturbed, she lets herself fall to the bottom of the pitcher, without appearing to be upset by the liquid there, and wanders among the half-digested insects captured by the plant, until she goes back to her web.

It is in exactly similar conditions that Mr. Dover found the individuals he took in Singapore. There too, the spider is strictly localised to a single species of *Nepenthes*, which has been identified by Mr. R. E. Holttum, Director of Gardens, Singapore, as *N. gracilis*. Mr. Dover tells me that in spite of active collecting he never found it outside the pitchers or in the urns of other species, notably those of *N. ampullaria* and *N. rafflesiana*, which are also common in the same area.

This spider, then, is interesting in its singularly localised habitat in a double way; unlike its allies which live on flowers, it lives on the vegetative parts of the plant; in the second place, in Borneo as well as in Singapore, it appears to live in a particular species of *Nepenthes*, very probably the same, since we know how doubtful is the identification proposed by Pocock, especially since *N. gracilis*, the definite host in Singapore has a very wide geographical distribution, being found in Labuan in precisely the same place from which the London specimens came.¹

It does not seem impossible to explain this double localisation.

It is known that the *Misumenops* and kindred genera live on flowers and for their prey attack the insects which visit them; but they do not pass their whole existence there: it is their hunting field and nothing more. They establish a retreat near by, on the plant which harbours them, and are obliged to come out to seek their prey. Now the pitcher of *Nepenthes* is a readymade

1. c.f. J. M. Macfarlane: Das Pflanzenreich, Nepenthaceae, 1908, p. 59.

retreat: it is already a folded leaf, with fused edges, a faultless horn such as no *Misumenid* could ever make. The spider uses it and limits itself instinctively to weaving a few threads here and there, not to consolidate so perfect a retreat, but to help it to wander easily over the internal slippery walls of the urn, and later to place its cocoon in it.

This retreat has, moreover, the immense advantage over those of other species, in being at the same time a marvellous trap for insects. All authors agree—and several have made minute experiments on the subject—that among all the glands present in the *Nepenthes* whose secretion attracts insects, none have so strong a power of attraction as the marginal glands on the peristome of the pitcher. Now, it is inside the urn, immediately below the peristome that the *Misumenops* lives, so that the insects in search of the sugary liquid, come to the very entrance of its retreat. Thus it is no longer necessary for the spider to leave its retreat.

In this way we can explain the constant presence of *Misumenops nepenthicola* in the urn, but our imperfect knowledge of the physiology of the *Nepenthes* on one hand, and the exigencies of the spider on the other, render it more difficult to explain why it elects this particular species to live in.

It must be remembered, however, that the pitchers of *Nepenthes* are of two different types. In the first type, which is the commonest and of which *N. ampullaria* is an example, the whole interior of the urn is covered with a strongly cutinised epidermis, shiny and slippery, provided with "digestive" glands, extending regularly from top to bottom. In the second type, on the contrary, to which *N. gracilis* and a small number of other species belong, the internal structure of the urn is more complex: between the peristome and the shiny, slippery zone provided with digestive glands, which occupies in this case the bottom of the urn, is a zone, often widely extended and generally coloured, whose secretion is more or less oily and does not attract insects. If they do come there, they slip into the liquid below.

It is evident that the *Misumenops* cannot live in the pitchers of the first type, since immediately below the peristome, together with its young and its eggs it would come into constant contact with the digestive glands, whose abundant secretion would be aggravated by the contact. In the urns of the second type, it finds a large surface on which it can establish itself in all security. This anatomical distinction restricts the choice of the spider and explains its presence in the interior of the urns of *N. gracilis*, as well as its absence from the numerous species of the first type and notably from *N. ampullaria*, in which Mr. Dover sought in vain. But it still does not account for its absence from the few species whose urns are of the same type as those of *N. gracilis*.

I am naturally at a disadvantage in solving this question. It rests with naturalists living in places where *Nepenthes* and *Misumenops* are found, to observe on the spot the anatomical and physiological peculiarities of each species of plant and to see what prevents the spider from entering their urns. The few reflections given here have no other object than to show that we ought to be able to arrive without much difficulty at the solution of the problem.

Before concluding, I shall give a simple suggestion for the guidance of collectors. It is reported that when the spider is disturbed, she does not come out of her retreat, but falls to the bottom of the urn—and this habit of falling at the end of a strand at the slightest alarm is normal with the *Misumenids*. But in this case, the spider finds, at the bottom of the urn, a liquid which has peculiar properties. According to the classic researches of Clautriau (1900 and Vines (1901) this liquid contains in *N. melampora* besides potassium chloride, citric and malic acid, carbonate of lime and magnesium—a ferment analogous to the pepsins and proteolysins which, according to the temperature, is capable of dissolving proteins in two to eight hours. Would the liquid in all species have the same composition and properties? If the liquid of *N. gracilis* was as active, it is hardly probable that the *Misumenops* would wander about in it so freely. I think it would be interesting not to neglect this aspect of the question.¹

Part V.—A new Tyroglyphid Mite (*Zwickia nepenthesiana*, sp.n.) from the pitchers of *Nepenthes ampullaria*.

By STANLEY HIRST

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My best thanks are due to Mr. C. Boden Kloss and to Mr. Cedric Dover for sending me sediment from the bottom of the pitchers of *Nepenthes ampullaria* from Singapore in which the mite described below occurred in considerable numbers. There were also remains, often partly digested, of a number of other species of mites, principally Oribatidae, but these are not dealt with in the present note.

1. It might be mentioned here that I made certain simple experiments on the relative digestive power of the fluid in the pitchers of the three species of *Nepenthes* I collected in Singapore. I found that in *N. gracilis* the fluid is very scarce and comparatively weak as compared with that of *N. rafflesiana* and even *N. ampullaria*. This fact, as Dr. Fage indirectly suggests, seems to provide the most important clue to the restriction of *Misumenops nepenthibicola* to *N. gracilis*. The biology of this spider, as Dr. Fage's remarks indicate, provides a most fascinating subject for local naturalists. C.D.

Zwickia nepenthesiana, sp. n.

♂. *Body* convex above, smooth and shiny. There is a pair of long rather stout hairs or setae posteriorly. All the other body hairs are much shorter and very fine. Some of the hairs on the venter, however, are longer than the others although not very long. All these hairs are quite plain being devoid of secondary hairlets. *Venter* with two pairs of rather small kidney-shaped suckers. *Legs* furnished with strong spines, especially the tarsi of the second and third pairs which have a terminal group of rather stout short spines. Fourth leg not nearly so strongly armed as the third, its claw is also shorter. *Claw* of first leg very short and stout. Claws of legs 2-4 rather long slender and slightly curved; they are, however, very much shorter than the tarsus itself.

♀. *Ventral suckers* larger and more elongated than in the male, the anterior pair being more lateral in position and extending outwardly between the second and third coxae. *Legs* and the spines thereon weaker than in the male, but the claw of the first leg longer and more slender than in that sex. The pair of posterior hairs is shorter than in the male.

Hypopial nymph. Size very small. *Epimera* weak and shaped as shown in figure. *Anal orifice* situated near the posterior end of the venter. Behind the anus and just before the posterior end of the venter there are five sucker-like appearances, but the three anterior ones are very indistinct, practically fused together and forming a short somewhat procurved transverse row, the middle sucker-like appearance being situated a little further back than the lateral ones. Posterior to these ill-defined structures there is a pair of very distinct circular suckers. *Tarsi* of anterior legs ending in a thin curved claw; tarsus of fourth leg ending in a fine hair. Hairs of legs not fan-shaped nor flattened.

Measurements. Length of body of male (not including long posterior hairs) .34 mm.; length of body of female .37 mm.; Length of body of hypopial nymph .21 mm.; its width .1 mm.;

Habitat. A number of specimens from the pitchers of *Nepenthes ampullaria*, found in the jungle round Thompson Road Reservoir, Singapore. Collected by Mr. Cedric Dover.

Remarks. This new species of *Zwickia* is easily distinguished from *Z. guentheri* Oudemans,* (living in *Nepenthes distillatoria* in Ceylon) by the much shorter claws of the posterior legs.

* "Die lebenden Bewohner der Kannen der insekten fressenden Pflanze *Nepenthes distillatoria* auf Ceylon. By Konrad Guenther, Zeitschr. f. wiss. Insektenbid. Dd. XI, 1915, heft 9/10, "Milben. *Anoetus guentheri* nov. sp." By Dr. A. C. Oudemans. pp. 241-243, 1 text-fig.

See also Ent. Ber. Ned. VI, 1924, No. 139, p. 310.

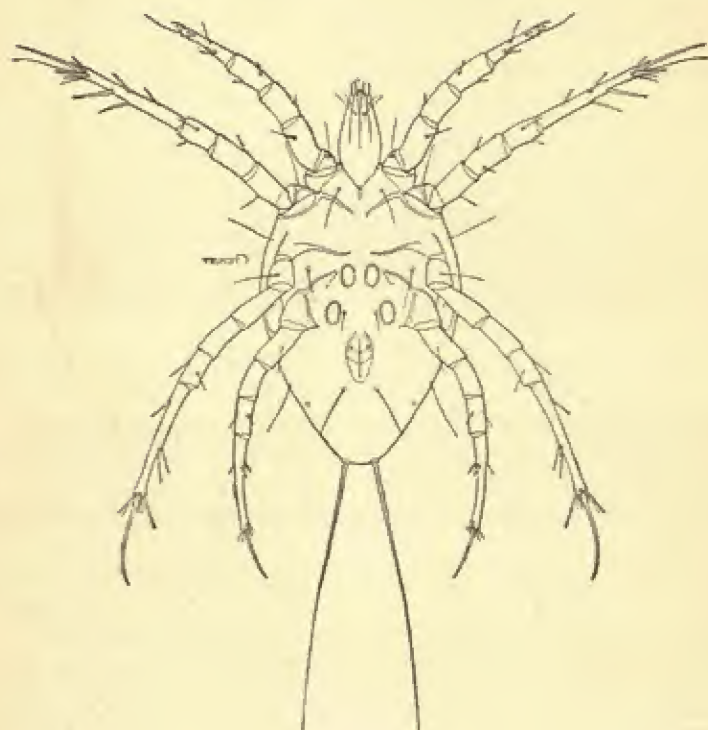
[The fact that the mites found in *Nepenthes ampullaria* and *N. distillatoria* are specifically distinct suggests a further enquiry with a view to discovering if the mites found in the various species of *Nepenthes* are peculiar to them. In Singapore the pitchers of *N. gracilis* are very clean as compared with the other species and I did not observe any mites in them, while unfortunately I did not search specially for mites on the few occasions on which I found *N. rafflesiana*. C.D.]

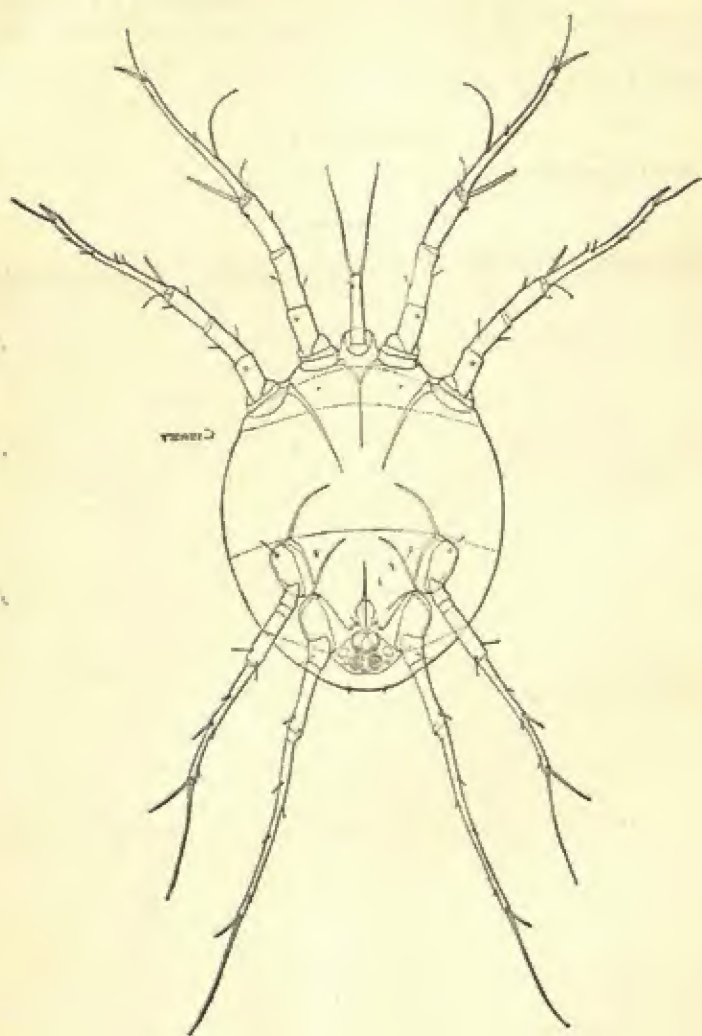
Text-figure 1.

Zwickia nepenthesiana, sp. n. ♀. Ventral aspect.

Text-figure 2.

Zwickia nepenthesiana, sp. n. Ventral view of hypopial nymph.





Part VI.—Lepidoptera-Heterocera.

By W. H. T. TAMS.

Family Noctuidae.

Subfamily *Erastrilinae*.**Eublemma radda** Swinhoe.

1901. *Eublemma radda* Swinh., Ann. Mag. Nat. Hist. (7), vii, p. 472.
 1910. *Eublemma radda* Swinh., Hmps., Cat. Lep. Phal. Brit. Mus. X, Noctuidae, p. 168, Pl. cliii, f. 25.
 1912. *Autoba radda* Swinh., Warren in Seitz, Macrolepid. World., div. 2, XL, p. 227, pl. 21, i.

This is the small Noctuid referred to by Mr. Dover, in the introduction to these reports, as being found inside the pitchers of *Nepenthes rafflesiana* from the Thompson Road Reservoir, Singapore, in April 1926. In the British Museum there are only three specimens in poor condition from Sarawak, Borneo—the type locality. The most interesting feature in connection with the moth is that it belongs to the same subfamily as the North American species of the genus *Exyra*, which are exclusively associated with the Sarraceniaceae.

[It may be again mentioned that though I only managed to breed one specimen, I often observed the pupa of this moth within the pitchers of *Nepenthes rafflesiana*, and the fact that *Autoba radda* belongs to the same subfamily as the North American *Exyra* moths, lends colour to my tentative supposition (see introduction) that it is exclusively associated with *Nepenthes*, as its American relatives are associated with *Sarracenia*. An additional argument in support of this opinion is the fact that *N. rafflesiana* is also found in Sarawak, Borneo, where the specimens of *A. radda* in the British Museum were taken. This opinion, however, remains to be definitely proved, and the problem should provide an interesting study for some interested naturalist in Singapore. CEDRIC DOVER].

Part VII.—Diptera.

By CEDRIC DOVER.

I had hoped that Mr. F. W. Edwards would give me a detailed report on the Diptera collected from *Nepenthes* in Singapore, but he has already completed a paper on the Culicines of pitcher-plants, collected by Surgeon-Commander D. A. Given, to be published with figures of many of the larvae. This note may, however, interest local students. It is based on identifications by Mr. Edwards.

The pitcher-plants of Singapore support at least eleven different species of Culicidae, representing five genera. The identified species are as follows:¹ *Megarhinus acaudatus* Leic. (from *N. rafflesiana*); *Uranotaenia brevirostris* Edw. (from *N. gracilis*);

1. Cf. Edwards, Ind. Journ. Med. Research, X, No. 2, 1922 (Synopsis of Adult Culicine Mosquitoes, part ii.).

Rachionotomyia aranoides Theo; *R. nepenthes* Edw. (from *N. ampullaria*); *Armigeres giveni* Edw. M.S. (from *N. rafflesiana*); *Aedes albopictus* Skuse=*Stegomyia scutellaris* Theo. nec. Walker (taken by Commander Given probably in *N. ampullaria*); *Culex* (*Lophoceratomyia*) *navalis* Edw. M.S. (from *N. ampullaria*). Commander Given kindly informs me that he has taken four more species of *Lophoceratomyia*, and an *Uranotaenia*, which are not likely to be identified for some time. Of the species mentioned here only one—*Megarhinus acaudatus* Leic. has been previously recorded from *Nepenthes* in Singapore.¹

R. aranoides is the commonest Culicine, its larvae being found in abundance in all the three species of *Nepenthes* which I studied, *M. acaudatus* appears to be more or less restricted to *N. rafflesiana*,² the pitchers of the other species being probably too small for its large and voracious larvae. The occurrence of *Aedes albopictus* is interesting, and should attract the attention of workers engaged in anti-mosquito campaigns to *Nepenthes*. No species of Anopheline has yet been recorded.

A Chironomid is abundant in all three species of *Nepenthes*, especially *N. ampullaria*. It has been identified by Mr. Edwards as *Dasybelea* sp., a genus hitherto unrecorded from pitcher-plants.

The only other dipteran which I observed in *Nepenthes* was the larva of a species of Syrphidae. Attempts to breed it were fruitless, and it is hoped that this will be done by some other worker.

Part VIII.—Protozoa.

by EKENDANATH GHOSH, M.Sc., M.D., F.Z.S., F.R.M.S.,

Professor of Biology, Medical College, Calcutta.

Introduction. It has long been observed by many biologists that living protozoa and other microscopic and small animals occur in the watery fluid in the pitcher of a pitcher plant. The first zoologist who studied the protozoan fauna of the pitcher plant was P. von Oye (Zur Biologie du Kanne von *Nepenthes melamphora*, Biol. Centrbl., 41, 1921, pp. 529-534). He identified six species of Rhizopoda and described a new species of *Amoeba* living in the liquid of *Nepenthes*. They are *Centropyxis aculeata*, *Diffugia constricta*, *Lesquerensia epistomium*, *Arcella vulgaris*, *Cochlipodium bilimbosum*, *Amoeba guttata*. The new species is *Amoeba nepenthesi*. In 1926, R. W. Hegner (The protozoa of the pitcher plant, *Sarracenia purpurea*, Biol. Bull. I, 1926, No. 3, pp. 271-276) gave a general note on the protozoan fauna of the liquid from ten pitchers of *Sarracenia purpurea* and described the results of his "experimental studies" on free-living protozoa of

1. Cf. Edwards, Bull. Entom. Research, XIV, p. 1, 1923.

2. It was, however, taken in the larger pitchers of *N. ampullaria* at Bukit Timah, Singapore.

the pitcher fluid. He mentions small flagellates resembling *Cercomonas*, *Bodo*, *Mastigamoeba*, several forms of amoebae, heliozoa-like forms and ciliates resembling *Prorodon* and *Holosticha*. He also noticed nematode worms, rotifers, small entomostracans, various forms of insects and insect larvae, mites and a spider. From his experimental work on the growth of *Paramoecium*, *Colpoda* and *Chilomonas* in the pitcher liquid he came to the conclusion that these animals can live in the pitcher liquid for an indefinite period in a perfectly healthy condition and may multiply there. In another paper (The inter-relation of Protozoa and the utricle of *Utricularia*, Biol. Bull., L, 1926, No. 3, pp. 239-270), R.W. Hegner described a series of experiments on the inter-relations of protozoa and *Utricularia* and the conclusions he derived from them. This paper has no direct bearing on the present one.

The present paper aims at making a brief survey of the protozoan fauna in the liquid of the pitcher-plant (*N. ampullaria*) from Singapore.

Living at a distance from the place, I had not the opportunity of examining fresh fluid and had to depend upon preserved materials with its disadvantages. The animals were fixed in a watery solution of corrosive sublimate.

SARCODINA.

Undoubted examples of naked lobose rhizopoda have been found in the collection. Several very small specimens of amoebae are recognized, but they are too deformed and contracted to allow of identification with certainty.

Amoeba verrucosa Ehrenberg.

A single specimen can be identified.

Testaceous lobosa are quite abundant.

Several species of *Arcella* can be definitely recognised.

Arcella hemispherica. Perty.

This species shows a slight variation in the height. The figure in Penard's Fauna Rhizopodique du Bassin du Lemman, p. 400, shows the proportion of height to diameter as 18 to 21, whereas in the present specimens the relation is 30 to 42. The aperture is also comparatively large in this case.

Arcella subhemispherica sp. nov.

The next species closely resembles *A. hemispherica* Perty, but it differs from it in the following points. The buccal surface of the test with the central aperture is not concave, but is placed in the same level with the margin. Two broadly conical eminences are formed on the converse side of the test due to the thickening of its wall. Two nuclei are distinct. The diameter is 0.086 mm. aneragely. The height is 0.05 mm.

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***Arcella subconica* sp. nov.**

Several specimens resembling *A. mitrata* Leidy, but differing from it in the following respects: The shape of the test is somewhat conical, being widest below (round the buccal surface) and broadly rounded above. The buccal surface is plane with a large central aperture. There is a distinct circular line (suture) just below the rounded apex. The diameter of the test is 0.052 mm. The height is 0.061 mm.

***Arcella singaporensis* sp. nov.**

Numerous specimens of this species are found. The test is deeply cup-shaped or hemispherical. The buccal surface is flattened, but is raised in the centre into a truncate cone at the end of which lies the aperture obliquely. A distinct nucleus is seen in the mass of cytoplasm separated from the inner surface of the wall of the test. Diameter of the test 0.065 mm. Height of the test (from the base of the cone) 0.037 mm. Height of the cone 0.0087 mm. Diameter of the aperture 0.0152 mm.

***Arcella triangularis* sp. nov.**

The last species has a triangular test, the three sides being convex and the three angles notched. The dorsal surface is slightly convex. The buccal surface is flat and has a large triangular aperture rounded at the angles which nearly touch the circumference. A single spherical nucleus is seen. The diameter of the test is .065 mm.

***Pyridicula klossi* sp. nov.**

A single species of *Pyridicula* is found. This seems to be a new species. The test is cup-like, the diameter being twice the height or so. A single nucleus is seen. The diameter is about 0.098 mm.

***Diplochlamys* sp.**

A single species of *Diplochlamys* is present. The test is cup-shaped and is distinctly thick with an outer and inner lining. The buccal side is oval. The border of the mouth has two wide fissures in the line of the lesser diameter. As a single specimen was detected, it is left unnamed till several specimens are to hand.

Several species of *Diffugia* are found:—

***Diffugia suburceolata* sp. nov.**

The first species has a test, broadly oval in shape. There is a distinct collar round the aperture. The surface of the test has numerous regularly arranged hemispherical depressions. There is a single nucleus. Diam. 0.431 mm. Height 0.47 mm. Diameter of the aperture 0.274 mm. The species resembles *D. urceolata* Carter, but differs from it in having a single nucleus, slight eversion of the collar, and in the presence of the hemispherical depressions.

***Diffugia pyriformis* Perty. var.**

In the second species, the test is pyriform with a terminal round aperture. The surface of the test is beset with numerous closely-placed raised dots. Height 0.1256 mm. Diameter 0.066 mm. Diam. of aperture 0.0274 mm. Resembling *D. pyriformis* Perty, it may be made a new species, due to the presence of regularly arranged dots on the surface of the test.

Diffugia subpyriformis

In the third species, the test is also pyriform with a terminal aperture. Surface of the test presents regularly-arranged elongately hexagonal areas excepting a circular area above the aperture. These areas have their long axes placed along the main axis of the test and are about ten in number along the length of the test. Narrow rod-like processes are seen projecting irregularly from the surface of the test. There is a large spherical nucleus. Diam. 0.04 mm. Height 0.067 mm. Diameter of the aperture 0.0282 mm.

***Diffugia singaporensis* sp. nov.**

The last species of *Diffugia* is peculiar in the shape of its test. The test consists of an elongately oval body and a somewhat spoon-like head separated from the body by a constriction. The large ovate aperture forms the margin of the spoon-like head. The surface of the body of the test is raised into numerous, small, regularly-arranged hemispherical projections. The cytoplasm is closely applied to the test. There is a large spherical nucleus. Height of the test 0.098 mm. Diam. 0.047 mm. Length of the head 0.047 mm. Width of the head 0.039 mm.

MASTIGOPHORA.

Although no distinct type of a flagellate was found, there are small bodies with indications of flagella which evidently go to prove that there must have been minute simple flagellates of monad-type.

CILIOPHORA.

No ciliates are found.

In addition to *Protozoa*, several species of *Rotifera*, two species of *Copepoda*, a species of *Cladocera* and several mites are found.

Numerous fragments of insect larvae are also seen.

A thorough working out of the animal and plant life in the pitcher fluid is highly desirable and will no doubt prove most fruitful.

On a Collection of Mammals from the Anamba Islands, South China Sea.

By F. N. CHASEN, C.M.Z.S., and C. BODEN KLOSS, F.Z.S.,

The following is an account of a collection made by one of us (F. N. C.) in the Anamba Islands in 1925: mammals were collected on Pulau Siantan (29 August—9 October) and Pulau Jimaja (10—18 October).

The only collection hitherto known from the islands was made by Dr. W. L. Abbott and Mr. C. Boden Kloss in 1899-1900 and reported upon by Mr. Gerrit S. Miller Jr. (*vide* appended bibliography).

From that collection thirteen new forms have been described by Miller, Lyon and Andersen and the mammalian fauna of the group (including *Nycticebus*, *Tragulus* and *Paradoxurus* recorded but not obtained) is made known to consist of sixteen species, one of which (*Tupaia glis*) has distinct forms on three islands, making eighteen forms in all for the Anambas.

On the second occasion topotypes of nine of the thirteen races were obtained: two *Rhinolophus* bats were missed, a rat (*Rattus cremoriventer flaviventer*) hitherto only known from Jimaja was not obtained and, as Pulau Riabu was not visited, no specimens of *Tupaia glis riabus* were collected.

The collection before us adds twelve forms to the list making a total of 30 for the whole group.

The additions consist of the following:—*Tragulus kanchil siantanicus*, *Tragulus kanchil anambensis*, *Rhinosciurus laticaudatus tupaoides*, *Rattus validus terempa*, *Rattus concolor*, *Pachyura murina*, *Galeopterus variegatus natunae*, *Pteropus vampyrus malaccensis*, *Pteropus hypomelanus lepidus*, *Cynopterus angulatus*, *Miniopterus* sp., *Rhinolophus affinis* subsp., and *Hipposideros cineraceus*.

Of these the following genera are new to the group:—*Rhinosciurus*, *Pachyura*, *Galeopterus*, *Pteropus*, *Cynopterus*, *Miniopterus* and *Hipposideros*: *Paradoxurus* and *Tragulus* were actually obtained for the first time.

New forms described below are:—

Tragulus kanchil siantanicus: Siantan.

Tragulus kanchil anambensis: Mata.

Sciurus tenuis siantanicus: Siantan.

Rattus validus terempa: Siantan.

The list given below indicates that the faunal affinities of the Anamba Islands are with the Malay Peninsula rather than the Natuna Islands. As can be expected from the isolated position of the group the indigenous mammals are only rarely inseparable from those of the mainland.

A List of the Mammals recorded from the Anamba Islands.

Primates.

1. *Macaca irus pumilus* Miller.
2. *Nycticebus coucang* Bodd.

Carnivora.

3. *Paradoxurus hermaphroditus* subsp.

Ungulata.

4. *Tragulus kanchil siantanicus* Chas. and Kloss.
5. *Tragulus kanchil anambensis* Chas. and Kloss.

Rodentia.

6. *Ratufa bicolor anambae* Miller.
7. *Sciurus notatus anambensis* Miller.
8. *Sciurus tenuis siantanicus* Chas. and Kloss.
9. *Lariscus insignis castaneus* (Miller).
10. *Rhinosciurus laticaudatus tupaoides* (Blyth).
11. *Rattus cremoriventer flaviventer* (Miller).
12. *Rattus surifer anambae* (Miller).
13. *Rattus sabanus strepitans* (Miller).
14. *Rattus rattus siantanicus* (Miller).
15. *Rattus validus terempa* Chas. and Kloss.
16. *Rattus concolor* subsp.

Insectivora.

17. *Tupaia glis chrysomalla* Miller.
18. *Tupaia glis anambae* Lyon.
19. *Tupaia glis riabus* Lyon.
20. *Pachyura murina* (Linn.).
21. *Galeopterus variegatus natunae* (Miller).

Chiroptera.

22. *Pteropus vampyrus malaccensis* And.
23. *Pteropus hypomelanus lepidus* Miller.
24. *Cynopterus angulatus* Miller.
25. *Miniopterus* sp.
26. *Emballonura monticola anambensis* Miller.
27. *Rhinolophus affinis* subsp.
28. *Rhinolophus nereis* And.
29. *Rhinolophus minutillus* Miller.
30. *Hipposideros cineraceus* Blyth.

Bibliography.

Scattered references to races of mammals restricted to the Anamba Islands occur in a number of works not mentioned below, but the papers listed herewith contain all the original descriptions peculiarly applicable to the islands and, in the main, the essential literature:—

1. Van Hasselt, A. L. and Schwartz, H. J. E. F. "De Poelau Toedjoeh in het Zuidelijk Gedeelte der Chineesche Zee."
Tijdschrift van het Koninklijk Nederlandsch Aardrijkskundig Genootschap, Jaangang 1898. Contains notes on the topography, inhabitants and products of the group. On p. 45 *Sciurus prevostii* (*S. notatus anambensis*?) is recorded from Jimaja but is stated not to occur on Siantan. Wild pigs and wild (but imported) cattle are recorded from Siantan. Wild pigs still occur is the Anambas but they are the descendants of domestic pigs and not an indigenous form of *Sus cristatus*.
2. Miller, Gerrit "Mammals collected by Dr. W. L. Abbott on islands in the North [sic.] China Sea."
Proceedings of the Washington Academy of Sciences, 2, 1900, pp. 203-246.
3. Kloss, C. Boden "Notes on a cruise in the Southern China Sea."
Journ. Strs. Br. Roy. As. Soc., 41, 1903, pp. 54-80.
Contains notes on the islands visited by Abbott and Kloss in 1900: also lists of the mammals and birds.
4. Lyon, Marcus Ward. "Treeshrews: an account of the Mammalian Family Tupaiidae."
Proc. U. S. Nat. Mus., 45, 1913, p. 88. Contains the original description of *Tupaia riabus* and *T. anambae*.

Macaca irus pumilus Miller.

Macaca pumilus Miller, 1900, p. 241: Tambelan Islands. Siantan, 2 ♂.

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Miller associates an adult male from Siantan with *pumilus* described from Pulau Bunoa, Tambelan Islands. We cannot separate the two animals before us on colour or size from examples from the Malay Peninsula, but we find that the Anamba specimens can at once be picked out by their broader, much truncated rostrums. As Miller noted, the palate is broader and less arched; and we consider the differences sufficient to maintain *pumilus* for the Anamba Islands.

Both our specimens are adult with large canines, but they are dissimilar in colour. One example is pale and very similar in tone to two adults from Singapore, but the other is much more richly coloured above and has the root of the tail blackened. Even the paler of the two is rather more deeply coloured than another adult male from Peninsular Siam and in the Anamba Islands the species is evidently as variable as elsewhere.

The external and cranial measurements given below are quite typical of animals from Malacca, Selangor and Penang.

External measurements: total length 980, 1005; head and body 460, 440; tail 520, 565 mm.

Cranial measurements: greatest length (exclusive of incisors) 119, 119; basal length 85.5, 83; zygomatic breadth 79, 78.5; maxillary tooth row (alveoli, exclusive of incisors) 38.5, 39 mm.

***Nycticebus coucang* subsp.**

A living example was seen in the possession of a Siantan Malay: the owner was emphatic in stating that it had been caught on the island.

***Paradoxurus hermaphroditus* subsp.**

A living juvenile from an island near Siantan was examined: in appearance it seemed to differ in no way from the form inhabiting the Malay Peninsula. The skin was not preserved.

***Tragulus kanchil siantanicus* subsp. nov.**

Type.—Adult male (skin and skull) collected on Pulau Siantan, Anamba Islands, on 22nd September 1925. Raffles Museum No. 2653.

Characters.—Differs from *fulviventer* Gray of Singapore Island, *bosei*¹ Bonhote of Borneo and *everetti*² Bonhote of Bunguran in having the nape band obsolete, and from at least the first two of these forms in its much brighter colour. *T. siantanicus* bears a close superficial resemblance to *T. javanicus stanleyanus* of the Rhio Archipelago but has not the large robust skull of the "napu" group.

1. *Syn. virgicollis* Miller, Proc. Biol. Soc. Wash., XVI, March 19, 1903, p. 37.

2. *Syn. natunae* Miller, Proc. Biol. Soc. Wash., XVI, 1903, p. 38.

Colour.—The series before us is so variable that the description of any one animal would be of little use. Above orange-ochraceous, much richer than in *fulviventer* but scarcely so red as in *T. javanicus rufulus* from Tioman. The nape stripe so heavily annulated that it is obsolete. Top of the head like the back. Underparts extremely variable but generally well suffused with orange-buff. Neck stripes and throat band uniform in colour and either well defined or almost obliterated. Only in one specimen can the underparts be said to be white with a narrow median coloured stripe enlarged on the abdomen: in another the coloured median area is bordered on each side by a narrow white stripe but in the majority the underparts are mostly coloured. In one rather abnormal specimen the upperparts are distinctly less reddish in tone and the nape stripe is absent.

External measurements of type:—head and body 465; tail 70; hind foot 121; ear 32mm.

Cranial measurements of type (canines 15 mm., molars scarcely worn):—condylo-basilar length 78, zygomatic breadth 45.5, upper molar row (alveoli) 36, least interorbital width 27 mm.

Specimens examined:—Seven, all from the type locality.

***Tragulus kanchil anambensis* subsp. nov.**

Type:—Adult female (skin and skull) collected on Pulau Mata, Anamba Islands on 10th October 1925. Raffles Museum No. 2713.

Characters:—Like *T. k. siantanicus* of Pulau Siantan, but less rufous and more yellow above. The difference in the colour of the upperparts is constant and applies equally well to juveniles of the two forms.

Colour:—Like *siantanicus* this is a variable form and no two specimens are exactly alike. As a series they show less white below than *siantanicus* but further specimens would probably eliminate this difference.

External measurements of type:—head and body 460; tail 75; hind foot (dry) 117 mm.

Cranial measurements of type (canines 4.7 mm.) teeth scarcely worn:—Condylo-basilar length 80; zygomatic breadth 42.5; upper molar row (alveoli) 37; least interorbital width 27 mm.

Specimens examined:—Five, all from the type locality.

Remarks:—*Tragulus* has not hitherto been obtained from the Anamba group although its presence in the islands was noted by Dr. W. L. Abbott.

A single specimen obtained on Jimaja in 1928 by Mr. M. R. Henderson seems nearest to *anambensis* but is not quite like any of our series: it possibly represents yet a third form.

***Ratufa bicolor anambae* Miller.**

Ratufa anambae Miller, 1900, p. 215: Pulau Jimaja, Anamba Islands.

Jimaja, 2 ♂, 2 ♀.

All of these adults are in beautiful fresh pelage and, on colour, inseparable from *peninsulae* of the Malay Peninsula. There is a tendency for the tawny-yellow on the inner side of the hind limbs of *anambae* to be reduced in extent, but the character is perhaps not very reliable.

The following skull measurements show that there is no difference in size between *anambae* and *peninsulae* (Miller, Smiths. Misc. Coll., 61, 1913, p. 25: Trang, Peninsular Siam) of which the ranges of seven topotypes are recorded in parentheses:—

Greatest length 72-73.5 (69-73); condylo-basilar length 59-61.2 (57.1-59.1), palatilar length 27-28 (25.4-28.1); diastema 14.5-16 (15.1-16); molar row (alveoli) 13.5-14.8 (12.6-14.1); interorbital breadth 27-28.2 (27.3-29.2); zygomatic breadth 44-46 (42.3-44.1).

In *melanopepla* from Telibon Island, Trang, the bullæ are reduced in size: in *anambae* they are much more elevated above the surface of the basioccipital than in *peninsulae* which is thus a valid race.

***Sciurus notatus anambensis* Miller.**

Sciurus anambensis Miller, 1900, p. 223: Pulau Siantan, Anamba Islands.

Siantan, 20 ♂, 4 ♀.

The squirrels that most nearly resemble *S. anambensis* are *S. dulitensis* from Western Borneo, *S. subluteus* from S. E. Johore and *S. maporensis* from the Rhio Archipelago, South of Singapore.

The under surface of the first is very variable, but when the colour of this agrees with the Anamba animal *dulitensis* is separable on its less grey throat (which is of the same colour as the chest) and much more extensive red pencil.

S. subluteus and *maporensis* are separable on their paler (less blackened) tails and paler rufous pencils: the latter is further distinguished by a less grey throat, as in *dulitensis*.

The external measurements of the series before us agree closely with those given by Miller for the type series.

The cranial measurements of five adults range:—greatest length 48-50.9; condylo-basilar length 41-42; median nasal length 13-15; diastema 11-11.9; upper molar row (alveoli) 9-9.9; zygomatic breadth 28.9-29; interorbital breadth 17-18.9 mm.

***Sciurus tenuis siantanicus* subsp. nov.**

Sciurus tenuis Miller, 1900, p. 221.

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Type.—Adult male (skin and skull) collected on Pulau Siantan, Anamba Islands on 21st. September 1925. Raffles Museum No. 2639.

Diagnosis.—In colour the Anamba specimens are exactly similar to a series of *tenuis* on the upper surface and it is only on the underparts that any difference is at all perceptible and here none of the Anamba series are as grey below as any from the mainland, but, taken together, are whiter on the underparts, this being particularly noticeable on the throat and chest: they are also rather less highly coloured on the scrotum and thighs. They are also whiter below than *tiomanicus*.

External measurements of type.—head and body 134; tail 133; hind foot 34; ear 15 mm.

Skull measurements of nine adults.—greatest length 37.2-38.5; condylo-basilar length 30.5-32; zygomatic breadth 23.2-24.2; least interorbital breadth 12.9-14; palatilar length 15.2-16.1; upper molar row 7.7-2. These measurements are in no way different from those of a number of topotypical *tenuis*. All that can be said of them is that they are, on an average, nearer to the maximum than the minimum of *tenuis*: we can detect no distinctions in form between skulls of topotypes and these of the Anamba series.

Specimens examined.—Siantan 5 ♂, 5 ♀.

Remarks.—In 1900 (Proc. Wash. Acad. Sci., II, p. 221) Miller regarded eleven squirrels taken on various islands of the Anamba group and one adult from Tioman as inseparable from typical *tenuis* of Singapore Island. The next year he separated the Natuna form as *procerus* (op. cit., III, 1901, p. 122) on account of its small size and although we have no specimens from the Natunas Miller's figures seem conclusive enough and the Anamba animal as the figures given above show, is clearly not *procerus*. Robinson (Journ. F. M. S. Mus., VII, 1917, p. 103) with twenty-six newly collected specimens from Pulau Tioman at his disposal described *tiomanicus* stating that it was a dull form, more allied to the northern *surdus* than to the brighter typical *tenuis*. This is the case as regards the upper parts while the lower surface is slightly less grey.

***Lariscus insignis castaneus* (Miller).**

Funambulus castaneus Miller, 1900, p. 217: Pulau Siantan, Anamba Islands.

Siantan, 5 ♂, 1 ♀.

This race was founded on a single immature male but the colour description applies fairly well to the series of adults before us.

In the original description *castaneus* is characterised as "darker" in colour than "*insignis*" from Trang, Peninsular Siam. This is perhaps a slip of the pen because, as the description itself

shows, the Anamba race is actually one of the brighter members of the formenkreise. On the underparts it is nearest to the very bright *diversus* of Borneo being only a little less red on the sides of the belly. On the upperparts it is almost inseparable from typical *insignis* of Sumatra and is indeed altogether nearest to that form, differing mainly in that the throat and breast are white and not suffused with ferruginous: *castaneus* is therefore much brighter than either *jalorensis* or *meridionalis* from the Malay Peninsula and Singapore respectively.

The bullæ of *castaneus* are large, about as in *diversus*.

External measurements of 6 adults:—head and body 168-188, tail 86-113 (one 63, imp?), hind foot 44-46, ear 17-18 mm.

Skull:—greatest length 49.5-51.5, condylo-basilar length 41-42, zygomatic breadth 28-29, upper molar row (alveoli) 8.9-9 mm.

***Rhinosciurus laticaudatus tupaoides* (Blyth).**

Siantan, 2 ♀; Jimaja, 1 ♂.

These specimens are separable from *leo* (southern extremity of the Malay Peninsula and Singapore) *rbionis* (Rhio Archipelago) and *robinsoni* (Pulau Tioman) by reason of the warmer colour of these latter forms, but although duller in tone than most *tupaoides* from Trang to Selangor they are exactly matched by some. They are separable from *laticaudatus* of Borneo by their creamy underparts.

The skulls of animals from Borneo, the Malay Peninsula (*tupaoides* subsp.) and from the Anamba Islands do not seem separable; but in those from each place there is considerable variation, especially in the length of the muzzle.

On account of individual variation both in colour (especially of the tail) and in skull, a word of warning seems advisable to those mammalogists who may think they perceive slightly differentiated (unnamed) local races.

The genus has not hitherto been recorded from the Anamba group.

***Rattus surifer anambæ* (Miller).**

Mus anambæ Miller, 1900, p. 205: Pulau Jimaja, Anamba Islands.

Siantan, 2 ♂, 2 ♀; Jimaja, ♂, ♀.

A well defined form characterised by its short tail.

Head and body: 165, 195, 193, 183, 188, 200 mm.

Tail: 135, 155, 181, 166, 165, 179 mm.

The series is variable, two examples being conspicuously brighter than the others.

***Rattus sabanus strepitans* (Miller).**

Mus strepitans Miller, 1900, p. 207: Pulau Siantan; Anamba Islands.

Siantan, 16 ♂, 6 ♀; Jimaja, 1 ♂.

This subspecies is separable at sight from *sabanus* of Borneo and *vociferans* of the Malay Peninsula by reason of its much darker upperparts.

Freshly collected specimens are quite white ventrally as in *vociferans*.

The curious elevation about the posterior region of the nasals, recorded by Miller, is noticeable throughout the series.

***Rattus rattus siantanicus* (Miller).**

Mus siantanicus Miller, p. 210: Pulau Siantan, Anamba Islands.

Siantan, 41 ♂, 16 ♀; Jimaja, 7 ♂, 3 ♀.

Miller separated *siantanicus* from "*alexandrinus*" of Trang, Peninsular Siam,¹ purely on the noticeably broader, less arched rostrum. With the large series in front of us we find that when comparison is made with field rats from various parts of Central and Eastern Siam the differences are rather fine but appreciable in the majority of cases.

On the other hand the large size of *siantanicus* is sufficient to separate it from the white-bellied field-rat of the Malay States, Sumatra and Borneo (*jalorensis* Bonhote) but we cannot see the alleged cranial distinctions between the latter and *siantanicus* except in selected cases.

External measurements of ten adults from the Anambas:—head and body 169-191; tail 187-215; hind foot 34-37; ear 19-22 mm.

An equal number of *jalorensis* from the Malay Peninsula, selected at random measure:—head and body 143-170; tail 161-179; hind foot 29-33; ear 20-21 mm.

With the exception of two immature animals from Jimaja in which the underparts are distinctly grey, and one or two adults from Siantan in which the pale underparts are slightly sullied with a grey flush, all the rats of the large series are white below and none seem truly representative of the house-rat, *diardi*.

On the upperparts the range of colour is rather large, animals in fresh pelage being darker and having the ochraceous-buff element much less evident than in worn examples in which the colour has become very rusty.

Mammæ 10.

***Rattus validus terempa* subsp. nov.**

Type.—Adult male (skin and skull) collected on Siantan Island, Anamba Islands, South China Sea, on 31st August 1925. Raffles Museum No. 2504.

1. The white-bellied field rat.

Characters.—Like *validus*¹ and *firmus*² but much darker above than either; differs from *integer*³ in the possession of an outer, anterior tubercle on the posterior upper molar.

Colour.—Back and sides grizzled black and ochraceous-buff lightening to hair brown and buff on the flanks and sides of the limbs. Underparts and inner surface of the legs creamy white, the line of demarcation well defined.

Skull and teeth.—General configuration of the skull as in *validus*; the supplementary tubercles on m^2 and m^3 well marked throughout the series except in one aged ♂ in which the teeth are extremely worn.

External measurements of type.—head and body 235, tail 255, hind foot 48, ear 23 mm.

Cranial measurements of type.—greatest length of skull 56.9, condylo-basilar length 48.3, palatilar length 25.7, upper molar row (alveoli) 9.8, median nasal length 22.2, least interorbital breadth 8.5, zygomatic breadth 27.5 mm.

Specimens examined.—8 ♂ (including the type) and 5 ♀ from Siantan; 1 ♀ from Jimaja.

Remarks.—In colour the series is fairly uniform on the upperparts, but rather variable below. In the flesh most of the specimens, like the type, had creamy white underparts but in the skins this has mostly changed to buff or even yellowish buff. In some there is a faint median hair-brown streak, most noticeable on the chest. In one or two the ventral hairs have grey bases and the underparts are sullied with grey in consequence: in one male from Siantan the whole of the underparts are grey with irregular buff stains.

The single specimen from Jimaja is washed with a richer brown on the upperparts, this being particularly noticeable on the flanks. It also has the interpterygoid space rather broader than in the Siantan series and may represent another race.

The type fairly represents the series as regards size, but one female has a very large skull; greatest length 60.9; condylo-basilar length 51.4 mm.

We use *validus* for the specific name of this new form but are by no means certain that it is the oldest name applicable.
***Rattus concolor* subsp.**

Siantan, 3 ♂; Jimaja, 1 ♂.

1. Miller, Proc. Biol. Soc. Wash., XIII, 1900, p. 141: Trang, Peninsula Siam.

2. Miller, Proc. Acad. Nat. Sci. Phil., 1902, p. 155: Lingga Island, Rhio-Lingga Archipelago.

3. Miller, Proc. Wash. Acad. Sci. III, 1901, p. 119: S. Natunas.
[Pt. III, 1928] *Royal Asiatic Society*.

We cannot separate these specimens which were taken near native houses from the "*concolor*" of Singapore town and furthermore when the skulls from the Anambas are placed side by side with some from various parts of Siam, we are still unable to perceive the distinctions attributed to *pullus* of Tioman Island (*M. obscurus* Miller, Proc. Wash. Acad. Sc., II, 1900, p. 213).

***Tupaia glis chrysomalla* Miller.**

Tupaia chrysomalla Miller, 1900, p. 232; Pulau Siantan, Anamba Islands. Lyon, Proc. U. S. Nat. Mus., 45, 1913, p. 88.

Siantan, 5 ♂, 12 ♀.

Ten of the series are adult with the underparts strongly ferruginous. One other adult (teeth unworn) is less richly coloured above and is almost, but not quite, inseparable from the *Jimaja anambæ*. The remainder of the series are immature in a dull pelage very different from that of the adults, but two examples in an interesting intermediate stage link up the two series.

The tails are very variable above. They range from a dark and almost uniform grizzle of black and tawny-ochraceous (the black predominating) in the young animals through grizzled ferruginous and black in the adults to one adult in which the lighter element on the upperside of the tail is only slightly less golden in tone than that of the underside. Most of the specimens have curious irregular black patches on the tail, probably a remnant of the young pelage.

External measurements of nine adults:—head and body 167-187, tail 132-158, hind foot 40-44, ear 15-18 mm.

Skull:—greatest length 52-54, condylo-basilar length 48.5-50, zygomatic breadth 26-27.2, breadth of braincase 19-20, maxillary toothrow 18.5-19.5 mm.

Mammæ, 2-2=4.

***Tupaia glis anambæ* Lyon.**

Tupaia chrysomalla (part.) Miller, 1900, p. 233.

Tupaia anambæ Lyon, Proc. U. S. Nat. Mus., 43, 1913, p. 89; Pulau Jimaja, Anamba Islands.

Jimaja, 3 ♂, 2 ♀.

One of the five specimens is immature but the others are adult in clean, almost unworn, pelage and available for comparison with the Siantan race of which Lyon had but a single example when he wrote his account of the *Tupaiaidæ* (*t. c. s.* pp. 1-188).

We agree that the Jimaja animals are separable from *chrysomalla* of Siantan. They are distinctly less reddish above but on the underparts we can perceive no differences between the two forms.

In this form also the colour of the tail above is variable. In the immature specimen it is very dark, in one adult it is uniformly grizzled like the back, in two other adults the apical third is dark and sharply defined while in the fifth the apical two-thirds are distinctly lighter than the back and the tip is actually clear ochraceous-buff.

3 adult skulls measure.—greatest length 49.5-50.5, condylo-basal length 46.2-47.2, zygomatic breadth 23.5-25.2, breadth of braincase 19-19.3, maxillary toothrow 18.4-18.9. It seems from these measurements (*vide* also Lyon, *l.c.* p. 93) that *anambæ* is rather smaller than *chrysomalla*.

Mammæ 2-2=4.

***Pachyura murina* (Linn.).**

Siantan, 1 ♂, 2 ♀.

***Galeopterus variegatus natunæ* (Miller).**

Galeopithecus natunæ Miller, Smiths. Misc. Coll., 45, 1903, p. 50: Bunguran Id., North Natunas

Siantan, 3 ♂, 2 ♀.

The largest female from the Anambas, which is unfortunately the only really adult animal in the series, has a condylo-basal length of 69 mm. We therefore place it with *natunæ* Miller from Gt. Natuna Island of which the type measured c.b. length 67.6 mm. and another adult ♀ in our possession 67 mm. The variation in the cranial characters of adults from the same locality is so great in this species that much larger series from both localities are necessary before the question can be settled in a satisfactory manner.

All the males before us are immature and in a mixed pelage of rufous and grey: the females are both in the silvery grey pelage common to the females of most races of *Galeopterus*. No. 2662 seems quite fully adult. It has a condylo-basal length of 69 and a zygomatic breadth of 44.5 mm. In the other specimen, No. 2608, the median, maxillary and fronto-nasal sutures are not quite closed; condylo-basal length 63, zygomatic breadth 43.5 mm. The younger animal has the palate shorter, broader and rounder, the teeth squarer, the interpterygoid space wider, the bullæ rounder and the inflated mastoid region much smaller.

***Pteropus vampyrus malaccensis* K. And.**

Pteropus vampyrus malaccensis K. And., Ann. Mag. Nat. Hist. (8), II, 1908, p. 368.

Siantan, 10 ♂, 5 ♀.

Excluding five immature animals (all without sagittal crest and with basi-occipital suture open) the dimensions of the above series are in agreement with *malaccensis* and not the smaller *natunæ* from the North Natuna Islands and Borneo.

Forearm, ♂ 195-203, ♀ 195-208: greatest length of skull, 75-82 mm.

There is no appreciable difference in colour between this series and an equal number from Singapore Island.

***Pteropus hypomelanus lepidus* Miller.**

Pteropus lepidus Miller, Proc. Wash. Acad. Sci., 2, 1900, p. 237.

Jimaja, 2 ♀.

P. lepidus described from the Tambelan Islands also extends to the islands near the east coast of the Malay Peninsula. Two forms have been described from the Natuna Islands off Western Borneo: *canus* from the northern islands seems to be very closely allied to *lepidus* (vide Andersen, Journ. F. M. S. Mus., IV, 1911, p. 217) and *annectens* from the southern islands is characterised by smaller teeth.

The specimens before us have teeth essentially as in *lepidus* from the Perhentian Islands and in colour they also seem to belong to this form. The characters on which *canus* was founded seem extremely slight (" *P. h. canus* differs in fact, only in having, as a rule, the silvery grey element even more strongly developed and purer in tinge, and the colour of the crown normally paler" And. l.c.s.).

In the Anamba specimens one is rather more silvered on the upper surface than the other, but not more so than a female from East Perhentian Island. On the head and mantle the brighter of the two can be matched by a male from Tioman.

Andersen mentions (l.c.s. p. 215, para 2) what appears to be a rather unusual phase in this species, viz. the spreading of the pale greyish element (i.e. of the back) over the anal region and over part or the whole of the flanks. No. 2721 from Jimaja represents an extreme development of this phase for the forehead and sides of the head are coloured in agreement with the silvered area of the underparts. In this specimen the gorget is dark seal brown, almost black.

Forearms, 137, 140 mm.

Skulls.—Total length 62.5, 65.2; zygomatic breadth 31, 36; mandible length 49, 50; upper teeth (c.—m², alveoli) 24, 24.5; lower teeth (c.—m², alveoli) 27, 26.5 mm.

***Cynopterus angulatus* Miller.**

Siantan, 5 ♂.

Forearms 66-71, ears 17-18 mm.; lambda to gnathion in two skulls 30.75-31 mm.

Emballonura monticola anambensis. Miller.

Emballonura anambensis. Miller, 1900, p. 236: Pulau Mobur, Anamba Islands.

Siantan 3 ♀.

In the colour of the underfur and size of the teeth these specimens from the Anambas agree with a series from the Malay Peninsula (*monticola* syn. *peninsularis*) but the skulls of the former are rather longer and relatively narrower.

Skulls (2):—occiput to anterior base of canine 14.5, 14.4; zygomatic breadth 8.9, 9; upper tooth-row excluding incisors (alveoli) 5.3, 5.4; breadth of brain case 6.9, 7 mm.

Forearms 45, 45, 45.5 mm.

Miniopterus sp.

Siantan, 6 ♀.

These bats do not appear conspecific with the small series one of us has recorded from Perak (Journ. Mal. Br. Roy. Asiat. Soc., IV, 1926, p. 156) as *M. medius*.

They are slightly smaller (forearms 39, 39, 39, 40, 40, 41) distinctly more naked on the interfemoral membrane and have the membranes originating well above the ankle.

They possibly represent *M. tibialis* Tomes (P. Z. S., 1858, p. 126: Amboyna).

Of the four skins two are in the dark phase: one is almost entirely red but has the lower back dark and another is dark with the head and neck as in the red phase.

Rhinolophus affinis subsp.

Siantan, 1 ♂.

R. nesites was described by Andersen (P. Z. S., 1905, 2, p. 104) from Bunguran Island, N. Natunas: the type and only specimen was a damaged female. The form was diagnosed as like *superans* from the Malay Peninsula but smaller and with shorter tibia (*superans* 25-25.8 mm. *nesites* 22.8 mm.).

The specimen before us has the tibia 22 mm. in length and it may therefore belong to the Natuna race.

Measurements.—forearm 49; 3rd metacarpal 35; III¹ 14.5; 4th metacarpal 36; IV¹ 10; 5th metacarpal 36; V¹ 11.5; tail 23; length of mandible 16; upper teeth 9.2 mm.

The skull of our specimen is damaged but the total length is not less than 23 mm.

Two other members of the genus are known from the Anamba Islands but were not obtained on the present occasion.

R. nereis (Ann. t.c.s p. 90) has the forearm about 45 mm: total length of skull 21.2 mm.

[Pt. III, 1928] Royal Asiatic Society.

R. minutillus Miller (Proc. Wash. Acad. Sci., 2, 1900, p. 235) is very small: forearm 39 mm.

***Hipposideros cineraceus* Blyth.**

Hipposideros cineraceus Blyth, Journ. Asiat. Soc. Bengal, XXII, 1853, p. 410.

Siantan, 2 ♂.

On the key given by Andersen for the *H. bicolor* group (Ann. Mag. Nat. Hist. (9), 2, 1918, p. 379) these two specimens with forearms 34-35 and one skull 13.4 (the other damaged) fall into *cineraceus*, the range of which is given as India, Burma, and Borneo.

On a Collection of Birds from the Anamba Islands, South China Sea.

By F. N. CHASEN, M.B.O.U., C.M.Z.S. AND

C. BODEN KLOSS, M.B.O.U., F.Z.S.

The Anamba Islands in the Southern China Sea lie nearly twice as far from Borneo as from the Malay Peninsula and rise from the shallow Sunda shelf within the 30 fathom contour line which embraces both the others as well. About as far distant from the Anambas as the Peninsula is the North Natuna group to the N.W., but these latter lie in rather deeper water (i.e., more than 35 fathoms). The Tambelan Islands, a little group of much smaller islands than the Anambas or Natunas, lie about 150 miles S.E. of the Anambas. They are situated on the edge of the 20 fathom contour line off the West Bornean coast. Our knowledge of their mammals and birds is derived entirely from the collections made on them by Dr. W. L. Abbott and Mr. C. Boden Kloss in 1899-1900. The centre of the Anamba group is approximately in Lat. 3° N. Long. 106° E.

Very little attention has been paid to the fauna of the Anambas and our knowledge of the mammals and birds is limited to the accounts of collections made by Abbott and Kloss during the same cruise in which the Tambelans were explored.

The present paper describes the birds obtained for the Raffles Museum on various islands of the Anamba group in September and October 1925 by Mr. F. N. Chasen and three native collectors.

The papers mentioned in the bibliography provide information concerning the islands: although the hills at the back of Terempa, overlooking the bay, are now mostly stripped of their original forest and planted with coconuts, even Siantan, the most heavily populated island of the group, is still largely covered with jungle.

Itinerary: Pulau Siantan 29 Aug.—9 Oct.; Pulau Ringi 11 Sept.; Pulau Telok Pau 25-27 Sept.; Pulau Jimaja 10-18 Oct. A few specimens were also obtained from Pulau Mata but these were brought in by natives.

If species included in the present collection are known to occur in the Natuna or Tambelan Islands we have noted this, using the names under which the birds were recorded by the authorities quoted. Where no detailed original reference is given by us "Hartert" signifies one of the two papers on the birds of the Natunas collected by Messrs A. Everett, C. Hose and E. Hose and published in "*Novitates Zoologicae*," I, 1894, p. 469 et Pt. III, 1928] *Royal Asiatic Society*.

II, 1895, p. 466: "Oberholser" indicates "The Birds of the Tambelan Islands, South China Sea," Proc. U.S. Nat. Mus., 55, 1919, p. 129. The measurements given are those of the wing, in millimetres.

Excluding migratory species the collection under review only adds four land birds to the avifauna of the Anamba group and it is more than probable that of these one species *Geopelia striata*, has been introduced.

Of the others, *Columba argentina* and the *Spilornis* are no doubt resident; and *Eurystomus o. orientalis*, belonging as it does to the typical form, may also be resident.

Such a result after twenty-five years seems to merit the statement that ornithologically the islands may be considered as now fairly well known, though further collecting on Jimaja might perhaps produce one or two more common Malaysian birds.

A number of migratory species were obtained for the first time, but from the point of view of local faunal comparisons these are of minor importance; and the total could no doubt be extended to include many more of the birds that visit the Malay Peninsula and Borneo.

Dr. Oberholser has described 22 subspecies from the islands: Of these topotypes of 18 were obtained. We have described two more: one of them, *Orthotomus atrigularis major*, was poorly represented in the material reported upon by Oberholser, but a large series was secured by Chasen.

From a study of the collection at his disposal Dr. Oberholser concludes that the Anamba Islands "are most closely related to the Malay Peninsula; less so but almost equally to Sumatra and Borneo; still less to Java and only comparatively slightly to Indo-China."

Our own conclusions are very similar but we would emphasize the relationship between the Malay Peninsula, Sumatra and the Anamba Islands and modify that suggested with Borneo. Comparison with Java we have not thought necessary.

Admitting 4 races that we have not seen we place the number of acceptable forms described from the Anamba group at 19 for we find ourselves unable to recognise 5 of the races proposed by Oberholser.

Of these 19 Anamba subspecies nine are in our own opinion separable from their nearest allies on large size alone; another 9 combine large size with colour distinctions, but these latter are in all cases by no means well marked. In only one instance (*Kittacincla*) does the difference appear to be in colour alone. The large average size of the Anamba races is an interesting fact confirmed by the present collection.

Close comparison of the avifauna of the Anambas with that of the Natunas is now desirable: we hope shortly to be in a position to make it.

A List of the Birds recorded from the Anamba Islands.

Names in square brackets are those used by Oberholser when his nomenclature differs in a marked degree from that employed by us.

Treronidae.

1. *Treron vernans adina* (Oberh.).
2. *Ducula ænea ænea* (Linn.).
Muscadivores aeneus polius Oberh.
3. *Myristicivora bicolor bicolor* (Scop.).

Columbidae.

4. *Columba argentina* Bp.

Peristeridae.

5. *Geopelia striata striata* (Linn.).
6. *Chalcophaps indica indica* (Linn.).
7. *Caloenas nicobarica nicobarica* (Linn.). Observed only.
C.B.K.

Rallidae.

8. *Rallina fasciata* (Raffles).

Laridae.

9. *Sterna bergii cristatus* Steph. [*Thalasseus b. pelecanoides*]
10. *Sterna sumatrana* Raffles. [*S. melanauchen*]
11. *Anous stolidus pileatus* (Scop.). Observed only. C.B.K. and F.N.C.

Charadriidae.

12. *Arenaria interpres interpres* (Linn.). [*A. i. oabuensis*].
13. *Squatarola squatarola hypomelus* (Pall.). Observed only F.N.C.
14. *Charadrius apricarius fulvus* (Gm.)
15. *Charadrius leschenaulti* Less.
16. *Charadrius mongolus atrifrons* (Wagl.).
17. *Charadrius dubius* subsp.
18. *Totanus totanus* subsp.
19. *Tringoides hypoleucus hypoleucus* (Linn.).
20. *Rhyacophilus glareola glareola* (Gm.).
21. *Limonites ruficollis* (Pall.).
22. *Capella stenura stenura* (Kubl.).

Glareolidae.

23. *Glareola pratincola maldivarum* *Forst.*

Oedicnemidae.

24. *Orthorhamphus magnirostris* subsp. Observed only, C.B.K.

Ardeidae.

25. *Demeigretta sacra sacra* (Gm.). Observed only, C.B.K. and F.N.C.
 26. *Butorides striatus* subsp. Observed only, C.B.K. [*B. javanica*]
 27. *Bubulcus ibis coromandus* (*Bodd.*).

Fregatidae.

28. *Fregata andrewsi* *Math.*
 29. *Fregata ariel ariel* (*Gould.*). [*?F. minor*]

Falconidae.

30. *Spilornis cheela* subsp.
 31. *Cuncuma leucogaster leucogaster* (Gm.) Observed only, W.L.A. and F.N.C.
 32. *Pernis apivorus orientalis* *Tacz.*
 33. *Spizaetus alboniger alboniger* *Blyth.*

Psittacidae.

34. *Conurus longicaudus longicaudus* (*Bodd.*).
 35. *Loriculus galgulus galgulus* (*Linn.*). Observed only, C.B.K.

Coraciidae.

36. *Eurystomus orientalis orientalis* (*Linn.*).

Alcedinidae.

37. *Alcedo atthis bengalensis* *Gm.*
 38. *Ceyx rufidorsus rufidorsus* *Strickl.*
 39. *Halcyon* sp. Observed only, F.N.C.
 40. *Halycon chloris cyanescens* (*Oberh.*).

Micropodidae.

41. *Micropus affinis subfurcatus* (*Blyth.*). Observed only, C.B.K.
 42. *Collocalia brevirostris lowi* *Sharpe.*
 43. *Collocalia francica amechana* *Oberh.*
 44. *Hemiprocne longipennis harterti* *Strese.*
 45. *Hemiprocne comata comata* (*Temm.*). Observed only, C.B.K.

Cuculidae.

46. *Phoenicophaes curvirostris erythrognaethus* *Bp.*

Hirundinidae.

- 47. *Hirundo rustica gutturalis Scop.*
- 48. *Hirundo javanica abbotti Oberb.*

Muscicapidae.

- 49. *Hemichelidon sibirica sibirica (Gm.)*
- 50. *Cyornis rufigastra lamprea Oberb.*
- 51. *Zanthopygia narcissina xanthopygia (Hay).*
- 52. *Hypothymis azurea opisthocyanea Oberb.*

Campephagidae.

- 53. *Coracina sumatrensis calopolius (Oberb.).*

Pycnonotidae.

- 54. *Aegithina viridissima thapsina Oberb.*
- 55. *Iole olivacea crypta Oberb.*
- 56. *Pycnonotus plumosus chirolethis Oberb.*
- 57. *Pycnonotus brunneus zapolius Oberb.*
- 58. *Pycnonotus simplex halizonus Oberb.*

Timaliidae.

- 59. *Malacopteron magnirostris flavum Chas. and Kloss.*
- 60. *Anuropsis malaccensis malaccensis (Hartl.).*
- 61. *Mixornis gularis zophera Oberb.*

Turdidae.

- 62. *Kittacincla malabarica ochroptila Oberb.*
- 63. *Kittacincla malabarica heterogyna Oberb.*

Sylviidae.

- 64. *Acrocephalus arundinaceus orientalis (Temm. and Schleg.).*
- 65. *Orthotomus atrigularis major Chas. and Kloss*
- 66. *Phylloscopus borealis xanthodryas Swinh.*

Laniidae.

- 67. *Lanius tigrinus Drap.*
- 68. *Lanius cristatus superciliosus Lath.*

Dicruridae.

- 69. *Dissemurus paradiseus platurus (Vieill.).*
Dissemurus paradiseus microlophus Oberb

Sturnidae.

- 70. *Gracula javana prasiocara Oberb.*
- 71. *Aplonis panayensis heterochlorus Oberb.*

Motacillidae.

72. *Motacilla cinerea caspica* (S.G.Gm.). [*M. melanope*]
 73. *Motacilla flava simillima* Hart.

Nectariniidae.

74. *Aethopyga siparaja siparaja* (Raffles).
Aethopyga siparaja ochropyrrha Oberh.
 75. *Leptocoma brasiliana eumecis* Oberh.
 76. *Anthreptes malaccensis malaccensis* (Scop.).
Anthreptes malaccensis anambae Oberh.

Dicaeidae.

77. *Dicaeum trigonostigmum trigonostigmum* (Scop.).
Dicaeum trigonostigmum hypochloun Oberh.

Bibliography.

In addition to the list of ornithological publications given by Dr. Oberholser in No. 3 below the following papers relate to the general zoology and the birds of the Anamba group:—

1. Van Hasselt, A. L. and Schwartz, J.E.F. "De Poelau Toedjoeh in het Zuidelijk Gedeelte der Chineesche Zee."
Tijdschrift van het Koninklijk Nederlandsch Aardrijkskundig genootschap, Jaargang 1898.
 Contains notes on the topography, inhabitants and products of the group.
2. Kloss, C. Boden "Notes on a cruise in the Southern China Sea." *Journ. Straits Branch Roy. Asiat. Soc.*, No 41., Jan. 1904, pp. 53-80. Contains an account of a visit to the Anamba and Tambelan Islands with information on their topography, people and zoology.
3. Oberholser, Harry C. "The Birds of the Anamba Islands." *Bull. United States National Museum* No. 98, 1917, pp. 1-75.
4. "Description of a new *Iole* from the Anamba Islands" *Proc. Biol. Soc. Wash.*, vol. 31, 1918, pp. 197-198.
5. Robinson, H. C. "A List of Birds from Pulau Tinggi." *Journ. F.M.S. Mus.*, vol. VII, 1919, pp. 325-29.
 Contains critical notes on some Anamba subspecies.
Journal Malayan Branch [Vol. VI,

Systematic.

Orthotomus atrigularis major subsp. nov.*Malacopteron magnirostris flavum* subsp. nov.1. *Treron vernans adina* (Oberh.).*Dendrophassa vernans adina* Oberh., p. 20: Pulau Mata.

Siantan, ♂ 146, 153, 158; ♀ 143, 150, 152.

Jimaja, ♂ 155, 162; ♀ 1 juv.

Ringi, ♂ 152, 154, 1 juv.; ♀ 145, 151.

In colour the above specimens only differ from "*vernans*" of the Malay Peninsula in being rather paler below, but *adina* is worthy of recognition on account of large size.

This race also occurs on Pulau Tioman and apparently also in the Natuna Islands (Hartert, Nov. Zool., I, 1894, p. 482).

Natunas, *T. vernans*, Hartert.Tambelans, ? *Dendrophassa vernans adina*, Oberholser.2. *Ducula aenea aenea* (Linn.).*Muscadivores aeneus polius* Oberh., p. 18: Pulau Siantan.

Siantan, ♂ 239; ♀ 228, 238, 242.

Jimaja, ♀ 230.

Telok Pau, ♂ 236, 238; ♀ 230.

Not separable on colour or size from *aenea* of which specimens from Borneo, Sumatra, the Malay Peninsula and Rhio Archipelago were available for comparison.

Natunas, *Carpophaga aenea*, Hartert.Tambelans, ? *Muscadivores aeneus polius*, Oberholser.3. *Myristicivora bicolor bicolor* (Scop.).*Myristicivora bicolor* Oberh., p. 18.

Ringi 4 ♂; 1 juv.

Telok Pau, 1 ♀.

Natunas, *Myristicivora bicolor*, Hartert.Tambelans, *Myristicivora bicolor*, Oberholser.4. *Columba argentina* Bp.

Jimaja, ♂ 240.

This bird was shot and preserved by a native collector and the colours of the soft parts were not noted.

A female of this rare pigeon in the Raffles Museum collection, which was obtained by Abbott and Kloss on South Pagi Island, West Sumatra, on December 12th, 1902, is labelled:—

"Iris orange suffused with red: bill pale apple green; cere and eyelids purplish brown: feet pale leaden blue, tinged red. C.B.K."

5. **Geopelia striata striata** (Linn.).

Siantan, 1 ♂; 1 ♀.

This is one of the very few non-migratory birds added to the fauna of the Anamba group by the present visit. It is a favourite cage bird with Malays.

Natunas, *Geopelia striata*, Hartert.

6. **Chalcophaps indica indica** (Linn.).

Chalcophaps indica indica Oberh., p. 17.

Siantan, 1 ♂; 1 juv.

Tambelans, *Chalcophaps indica indica*, Oberholser.

7. **Rallina fasciata** (Raffles).

Siantan, 1 ♂, 29th Sept.

8. **Sterna bergii cristatus** Steph.

Thalasseus bergii pelecanoides Oberh., p. 15.

At sea near Siantan, 2 ♂, 346,—.

Natunas, *Sterna bergii*, Hartert.

9. **Charadrius apricarius fulvus** (Gm.).

Pluvialis dominica fulva Oberh., p. 13.

Jimaja, ♂, 12th Oct.

Natunas, *Charadrius fulvus*, Hartert.

Tambelans, *Pluvialis dominica fulva*, Oberholser.

10. **Charadrius dubius** subsp.

Siantan, ♀ 115, 23rd Sept.

Jimaja, ♂ 113, 17th Oct.

We are inclined to attribute these two specimens to the larger migratory *curonicus* and not the smaller resident *jerdoni*.

11. **Totanus totanus totanus** (Linn.).

Jimaja, ♀ 151, 10th Oct.

Wintering redshanks from Malaysia have always been associated by Oberholser with *eurbinus* described by that author from Ladak and separated from typical *totanus* on account of larger size, although seemingly identical in colour.

Additional material from Ladak reported on by R. and A. C. Meinertzhagen (Bull. B.O.C., XLVI, 1926, p. 85) indicates that the difference in size between the two is very small, and these ornithologists remark that "the acceptance of *eurbinus* on measurement alone is a matter of doubt."

T. t. terrignotae from still further east than *eurbinus* (typ. loc., Kuku Nor) is then separated (loc. cit.) on colour differences and it is stated that birds of this form in winter plumage were examined from Borneo and the Malay Peninsula.

The ranges of the wing lengths are:—

totanus 150-162.

eurbinus 157-170.

terrignotae 151-169.

It will be seen that *terrignotae* exhibits both the minimum of *totanus* and the maximum of *eurbinus*. It is stated to differ in colour. On account of its size we place our bird with the typical form.

We doubt if the action of Col. and Mrs. Meinertzhagen in proposing *terrignotae* is likely to meet with general approval and we cannot see that it is anything more than a renaming of an eastern race of the redshank, *eurbinus* Oberholser.

Only if Ladak birds were inseparable from typical *totanus* would *eurbinus* become a synonym and *terrignotae* valid, but even on the showing of the authors just quoted this is not the case for *eurbinus* is the larger form (wings *totanus* 150-162, *eurbinus* 157-170 mm.).

Although toptotypical specimens of *eurbinus* may not be different in colour, or so distinct from *t. totanus* as are birds from further east, say from Kuku Nor (the type locality of *terrignotae*) it is quite clear that they are intermediates which differ from the western race though they do not truly represent an eastern one.

If we sank *eurbinus* and accepted *terrignotae* with the principal implied by its proposers we could at the moment erect many "new" nominal races of oriental birds on the grounds that the nearest, relevant racial type is either an intermediate, or conversely, an extreme, not rigidly consubspecific with the material to be identified.

Until ornithologists adopt a more exact system of nomenclature than that in use at present such cases are inevitable but in the meantime we suggest the policy of using available names if they can in any way be considered applicable.

12. *Tringoides hypoleucus hypoleucus* (Linn.).*Actitis hypoleuca* Oberh., p. 15.

Siantan, ♀, 20th Sept.

Natunas, *Totanus hypoleucus*, Hartert.Tambelans, *Actitis hypoleuca*, Oberholser.13. *Rhyacophilus glareola* (Gm.).

Siantan, 3 ♀, 29th Aug., 25th, 26th Oct.

Natunas, *Totanus glareola*, Hartert.14. *Capella stenura stenura* (Kuhl).

Siantan, ♀,—: 14th, 21st Sept.

15. *Glareola pratincola maldivarum* Forst.

Jimaja, 2 ♂, 2 ♀; 13th, 14th, 16th Oct.

16. *Bubulcus ibis coromandus* (Bodd.).

Siantan, 1 ♂, 1 ♀; 3rd, 10th Oct.

[First seen at Terempa 26th Sept. F.N.C.]

17. *Ardeola grayi* (Sykes).

Jimaja, ♀ 215; 15th Oct.

18. *Fregata andrewsi* Math.

Ringi, ♂, total length (in the flesh) 920, wing 605, bill from gape (in the flesh) 131, culmen 114.

♀ ♀, total length 985, 995, 945, 987, 1005, 1020, 1008, 1020, 1014, 964, 990, 1010, 919; wing 645, 645, 660, 640, 640,—, 656, 650, 655, 630, 650, 657,—; bill from gape 151, 156, 153, 151, 153, 160, 157, 155, 156, 152, 151, 160, 153; culmen 127, 131, 132, 129, 130, 135, 135, 134, 134, 131, 125, 134, 132.

♂, irides dark brown; lids, orbital skin and bill black; pouch vermilion; tarsus and soles fleshy, toes and web blackish brown; inside the mouth salmon pink.

♀, (a) irides brown; bill and pouch pale rose pink; feet pinkish flesh; inside the mouth pale salmon pink;

(b) bill very pale whitish rose pink; pouch and orbital skin deeper pink.

The known range of *F. andrewsi* is now Christmas Island, Cocos Keeling Islands, Anamba Islands, Sarawak (vide Chasen and Kloss, Journ. Malayan Branch, Roy. Asiat. Soc., II. 1924, p. 64), Java (fide M. Bartels Jr., Club van Nederlandsche Vogelkundigen Jaarbericht No. 14, Aflevering 4, 1925, p. 155). Celebes and "coasts of India" (fide Stuart Baker).

The above females form a very uniform series varying only in the intensity of the brown bar on the wing and in the size of the whitish nuchal patch which in some examples is almost obsolete. In one specimen it is much wider than in the rest of the series—but a rich buff tinge bordering the black gorget indicates that this bird is not fully adult. The male has the black breast mottled with white.

19. *Fregata ariel ariel* (Gould).

? *Fregata minor minor* Oberh., p. 12.

Ringi. ♂ ♂, total length (in the flesh) 777, 763; wing 545, 538; bill from gape (in the flesh) 106, 105; culmen 91, 87.

♀ ♀, total length 788, 828, 855; wing 560, 550, 554; bill from gape 111, 110, 114; culmen 88, 93, 95.

♂, (a) irides brown; lids and orbital skin black; maxilla brown with fleshy sutures; mandible mixed brown and fleshy; tarsi fleshy; toes and webs black; inside the mouth red.

(b) irides brown; lids and orbital skin black; maxilla and mandible whitish horn, very faintly washed with rose pink; interramal skin vermilion; gular pouch fleshy spotted with vermilion; tarsi proximally whitish flesh, distally blackish brown; toes etc. blackish brown.

♀, (a) irides brown; lids and orbital skin rose pink; bill and feet whitish rose-pink; inside the mouth fleshy.

(b) irides brown; lids and orbital skin deep rose-pink; bill pale bluish slate; pouch dull brownish red; feet pale orange; inside the mouth salmon-pink.

(c) irides brown; lids and orbital skin above the eye deep rose-pink, below the eye bluish flesh; bill whitish rose-pink; inside the mouth fleshy.

All the above females show a buff tinge on the breast.

[Although frigate-birds rarely, if ever, approach the port of Singapore they are common a few miles out to sea and on the present occasion became numerous as soon as the Horsburgh Lighthouse (33 miles east of Singapore, at the entrance to the Southern China Sea) was reached. Among the islands of the Anamba group they are fairly common, but their hunting grounds seem yet further afield for it is only at dusk that they become

really conspicuous, although during the day small parties may be seen fishing in the sheltered water between the islands where the flying-fish undoubtedly forms part of their food.

Sometimes in the late afternoon huge flocks may be seen wheeling about, high in the air, above Terempa Bay. This is a preliminary to the nightly flight to Pulau Ringi, an islet off the west coast of Mobur, where on the trees many thousands of frigate-birds congregate nightly.

It will be seen that in the series of skins obtained females of *andrewsi* predominate and field observations indicate that this is really a fair index to the actual status of the birds in the Anamba Islands at the time of my visit. The colours of the soft parts given above were noted from living specimens. The Malays of the Anamba Islands call all frigate-birds "timbang" and always associate their presence with a fish, "sembak" (syn. "tongkol"). The movement of the shoals of this fine fish (*Thynnus*) can be detected from a fair distance as they harass the smaller "tamban" (small *Clupeidae*) and this latter, according to my informants, forms the chief food of the frigate-birds. F.N.C.J.

20. ***Spilornis cheela*** subsp.

Siantan, ♀ imm. 358.

Although immature this bird appears to be fully grown and its wing length removes it from *S. salvadorii* described from Nias, but also stated by Swann (Syn. Acc. 2nd ed. 1922, p. 135) to occur in the Natunas, a conclusion, however, we are by no means prepared to accept. Natunas, *Spilornis pallidus* subsp.,?, Hartert.

21. ***Pernis apivorus orientalis***. Tacz.

Jimaja, ♀ 455; 15th Oct.

A large, dark, non-crested example.

22. ***Spizaetus alboniger alboniger*** Blyth.

Siantan, ♂ total length (in the flesh) 115; bill from gape 39; wing 328; 22nd Sept.

An immature specimen of this rather rare hawk. Salmon-buff below, brown above; crest feathers black with a narrow white tip; a few large black spots on the breast and the legs spotted with black.

23. ***Eurystomus orientalis orientalis*** (Linn.).

Jimaja, ♀; 11th Oct.

Natunas. *Eurystomus calonyx*, Hartert.

24. **Alcedo atthis bengalensis** Gm.
Alcedo ispida bengalensis Oberh., p. 23.
 Siantan, ♂; 23rd Sept.
 Natunas, *Alcedo ispida bengalensis*, Hartert.
25. **Halcyon chloris cyanescens** (Oberh.).
Sauropatis chloris cyanescens Oberh., p. 22.
 Siantan, ♂ 108.
 Natunas, *Sauropatis chloris cyanescens*, Oberholser, (Proc. U.S. Nat. Mus. 55, 1919, p. 365).
 Tambelans, *Sauropatis chloris cyanescens*, Oberholser.
26. **Phoenicophaes curvirostris erythrognathus** Bp.
Urococyx erythrognathus Oberh., p. 22.
 Siantan, ♂.
 Natunas, *Phoenicophaes microrhinus*, Hartert.
27. **Hirundo javanica abbotti** (Oberh.).
Hypurolepis javanica abbotti Oberh., p. 32: Pulau Manguan, Anamba Islands.
 Siantan, ♂ 104,—, 100, 109, 106, 106, 110.5; ♀ 105,—.
 Jimaja, ♀, 106.

The adults of this series differ from topotypes of *javanica* in their darker throats, but we cannot separate Anamba birds, freshly collected specimens from Singapore Island and some others from Perak and the Langkawi Islands.

The differences in size seem insignificant. Seven Javanese birds average 103.5, the series from the Anamba Islands listed above 105.8, and seven from the Malay Peninsula and Singapore 105.

Riley (Proc. U. S. Nat. Mus. 64, 1924, p. 65) has already used *abbotti* to include birds from the Philippines, Borneo, coast of the Malay Peninsula, the Anambas, and the Mergui Archipelago.

We have little belief in the contention that *domicola* (Nilgiri Hills) extends to the Malay Peninsula, but if this is so *abbotti* becomes a synonym of the earlier name. Otherwise *abbotti* must be used for birds from the Malay Peninsula and Anambas.

Natunas, *Hirundo javanica*, Hartert.

Tambelans, *Hypurolepis javanica abbotti*, Oberholser.

28. **Hirundo rustica gutturalis** Scop.
Hirundo rustica gutturalis Oberh., p. 28.

Siantan, ♀ imm. 6th Oct.

Jimaja, ♀ imm. 10th Oct.

[First noted 8th Sept. and several times after that date until 7th Oct. when large flocks appeared at Terempa F.N.C.].

Natunas, *Hirundo rustica gutturalis*, Hartert.

29. **Hemichelidon sibirica sibirica** (Gm.)

Siantan, ♂ imm., wing 82 mm.; 29th Sept.

This is a young bird with albescent spots on the upper parts. The wing-coverts and inner secondaries and broadly edged with whitish buff: this latter character, is not obvious in any of our series of *H. s. sibirica*, from the Malay Peninsula but is well shown in an example from Borneo.

30. **Cyornis rufigastra lampra** Oberh.

Cyornis banyumas lampra Oberh., p. 35: Pulau Jimaja, Anamba Islands.

Siantan, 6 ♂: Jimaja, 2 ♂.

No females were obtained, but we have been able to inspect three from the type series. These are grey-blue or blue above and in our opinion the bird is the local representative of the "formenkreis" *rufigastra* and has nothing to do with the *banyumas* group in which the females are grey-brown or brown.

The males are very near to *sumatrensis* from which they differ at most in being very slightly paler on the back, slightly more washed with fulvous on the flanks and slightly larger.

31. **Hypothymis azurea opisthocyanea** Oberh.

Hypothymis azurea opisthocyanea Oberh., Proc. U.S. Nat. Mus., 39, 1911, p. 602; Pulau Piling, Anamba Islands. Id., Bull. U.S. Nat. Mus., 98, 1917, p. 39.

Siantan, ♂ 75, 77.

Both these males have the abdomen, under tail coverts and axillaries tinged with blue and are larger than any of a large series of *styani* from the north Malay Peninsula or *prophata* from the south Malay Peninsula and Borneo; a small series of *prophata* ♂ from Sumatra have the wings 67-70, 75 (1) mm.

32. **Coracina sumatrensis calopolius** (Oberh.).

Artamides sumatrensis calopolius Oberh., p. 34: Pulau Mata, Anamba Islands.

Siantan, ♂ 175, 175, imm. 166, 173; ♀ 169.

On colour, or in the matter of the barring of the female, we cannot separate the above birds from Malayan material but, if this race is different from *bungurensis*

Hartert (Nov. Zool., 1894, p. 477: Bunguran, Natuna Islands) which we have not seen, it can be upheld by virtue of large size.

In the Raffles Museum collection five males from the Malay Peninsula range 151-160, one from the Rhio Archipelago 164, nine females 150-157: Sumatran males are (*vide* Robinson and Kloss) 150-159, females 140-151. The series quoted is not extensive, but sufficient to indicate that the Anamba bird is distinctly larger than *sumatrensis*.

A female from Pulau Tioman, east coast of Pahang, with a wing of 162 mm. should be referred to *calopolius*.

Natunas, *Graucalus bungurensis*, Hartert.

33. *Aegithina viridissima thapsina* Oberh.

Aegithina viridissima thapsina Oberh., p. 40: Pulau Siantan, Anamba Islands.

Siantan, ♂ 67, 67; ♀ 66.

We can detect no colour differences between Anamba and Malayan birds which are similar to those of Borneo and Sumatra, and the race can only be maintained on slightly larger size.

Ten males from the Malay Peninsula range 61-63 but two from Penang and Terutau have wings of 66 mm.: the maximum of fifteen females is 63 mm. Three birds from Sumatra measure 63, 63, 64 mm.

In colour one of the males listed above confirms the subspecific characters given by Oberholser but we consider that this bird is not fully adult: the other male is exactly like freshly collected specimens from the Malay Peninsula.

Natunas, *Aegithina viridissima*, Hartert.

34. *Pycnonotus plumosus chiroplethis* Oberh.

Pycnonotus plumosus chiroplethis Oberh., p. 41: Pulau Siantan, Anamba Islands. Robinson, Journ. F. M. S. Mus., VII, 1919, p. 328: Pulau Tinggi.

Siantan, ♂ 90, 89, 88, 89, 90, 90, 86, —, 89, 92, 85, 87, 92, 91; ♀ 85, 85, 85, 86, 90, 89, 86.

Not separable on colour from *plumosus* of which large series were available for comparison. The Raffles Museum series of *plumosus*, mostly from Singapore, measure ♂ 83-91, average of ten 85.9; ♀ 80-89, average of ten 83: a large series from all parts of the Malay Peninsula in the Selangor Museum range 79-87. By dint of rather fine splitting *chiroplethis* can therefore be maintained on larger average size, ♂ 89.1; ♀ 86.6.

Anamba birds have reddish-brown irides like *plumosus* therein differing from the otherwise identical *inornatus* Bp. of Sumatra and the Mentawi Islands which has yellow irides.

35. ***Pycnonotus simplex halizonus* Oberh.**

Pycnonotus simplex halizonus Oberh., p.243: Pulau Jimaja, Anamba Islands.

Siantan, ♂ 84, 86,—,84; ♀ 83,—; 1 mm.; 1 sex ?

Jimaja, ♂ 84; ♀ 82.

We cannot separate these birds on colour from *simplex* of the Malay Peninsula. A large series of these latter have a wing-range of 76-85 with an average of 80 mm: *halizonus* with an average of 84 mm. is therefore best maintained.

Natunas, *Pycnonotus simplex*, Hartert.

36. ***Pycnonotus brunneus zapolius* Oberh.**

Pycnonotus brunneus zapolius Oberh., p.45; Pulau Siantan, Anamba Islands.

Siantan, ♂ 85,—,87, 88, 89,—,89, 85, 89, 82,—,90, 86; ♀ 85, 85, 85,—,89.

This race was described on a single male from Siantan. When fresh skins are compared we can see no colour differences between *zapolius* and *brunneus*. This insular race again stands on its very slightly larger size: *zapolius* ♂ 82-90, average of 10, 87; ♀ 85-89, average of 4, 86: Sumatran *brunneus* range ♂ 77-88, average of 9, 84.1; ♀ 78-80, average of 6, 79: twenty of both sexes from the Malay Peninsula range 74-88 with an average of 81.5.

Four birds from Pulau Tioman have wings of 87, 88, 89, 89 and should be placed in this race.

Natunas, *Pycnonotus simplex* (iris "crimson"), Hartert.

37. ***Malacopteron magnirostris flavum* subsp. nov.**

Horiçillas magnirostris Oberh., p.47.

Near *magnirostris* (Moore, 1855: Malacca) but with the rufous chestnut of the tail coverts and tail decidedly less strong. Size on average distinctly larger.

Five males have the wing measuring 81, 82, 84, 85, 86 mm.: no bird from the Malay Peninsula has a wing over 84 and most are under 81.

Birds from Pulau Tioman are like those from the mainland.

Type.—Adult ♂, collected on Siantan Island, Anamba group, 21st. Sept. 1925. Total length 181, wing 85, bill from gape 24 mm.

38. *Anuropsis malaccensis malaccensis* (Hartl.).*Anuropsis malaccensis malaccensis* Oberh., p.48.

Siantan, ♂ 72; ♀ 68.

Natunas, *Anuropsis malaccensis*, Hartert.39. *Mixornis gularis zophera* Oberh.*Mixornis pileata zophera* Oberh., p.49: Pulau Telaga, Anamba Islands.

Siantan, ♂ 62,—, 65, 66; ♀ 59, 59,—, 62.

Jimaja, ♂ 65, 65.

A series of sixty of the south Malayan form *pileata*, mostly fall below 60 mm. in wing length, but one or two reach 61 mm.: of thirty of the northern *connectens* only one specimen reaches 61 mm. The doubtfully distinct *sumatrana* is also small, the wings of eighteen from W. and N.E. Sumatra ranging 55-61 mm. The Anamba race can therefore stand on size alone.

We cannot see that the upper surface of *zophera* is darker than that of *pileata* (restr.) but *zophera* is rather paler on the crown, paler below and perhaps has the chestnut of the pileum more extended posteriorly although this latter distinction is very fine. On the underparts the streaks are heavier than in *connectens* but not more so than in *pileata*.

We have not seen this species from the Tioman group of islands but two birds from the Rhio Archipelago are rather large, Pulau Bulan 65 mm., and Pulau Galang 62 mm. Specimens from Pulau Bintang are small.

Natunas, *Mixornis everetti*, Hartert.40. *Kittacincla malabarica ochroptila* Oberh.*Kittacincla malabarica ochroptila* Oberh., p.51: Pulau Siantan, Anamba Islands.

Siantan, ♂ 98, 96, 102, 102; ♂ imm.

All these birds are moulting and not one has the tail complete: the wing measurements should be accepted with a certain amount of reserve and perhaps they do not express the maximum development of the wing. The type series of this race appears to have been in exactly the same condition, but the two series of measurements taken are sufficient to indicate that *ochroptila* is a larger bird than *tricolor* from the Malay Peninsula. In thirty males of this latter race twenty-five have the wing of 96 mm. or less: the remaining five birds measure 97, 97, 97, 98, 100 mm.

The Anamba males are at once separable from those of *interposita* and *tricolor* by the paler tawny colour of their underparts but we can detect no other colour differences.

Of three males from Pulau Tioman, one is inseparable from *tricolor* and two are paler but nearer to *tricolor* than to *ochroptila*. Their wings measure 96, 97, and 99 mm.

Natunas, *Cittocinclla macrura*, Hartert.

41. ***Acrocephalus arundinaceus orientalis*** (Temm. & Schleg.).

Siantan, ♂ 29, 30 Sept.; ♀ 15 Sept., 6 Oct.

Jimaja, ♀ 16 Oct.

Only one of these birds has the second primary as long as the fourth: in two it is exactly intermediate between the fourth and fifth and in the remaining two it is equal with the fifth! (cf. F.B.I., Birds, 2nd ed., II, p. 388).

42. ***Orthotomus atrigularis major*** subsp. nov.

Orthotomus atrogularis Oberh., p.54.

Siantan, 15 ♂; 1 ♀.

Jimaja, 2 ♂.

Wings of adult black-throated males:—49, 49, 48, 48, 48, 48, 47, 47, 47, 47, 47, 46, 46, 46.

(Irides yellowish brown; maxilla almost black; mandible whitish horn; feet fleshy washed with brown.)

Like *Orthotomus a. atrigularis* of the Malay Peninsula ("Malacca") but larger.

Wings of 15 Anamba males 46-49; average 47.3 mm. Ten males from the south of the Malay Peninsula measure 43, 43, 43, 44, 45, 45, 45, 45, 45, 46; range 43-46; average 44.4. Seven males from Peninsular Siam (*O. a. nitidus* Hume) 43, 43, 44, 45, 45, 46, 46; range 43-46; average 44.5. Three males from Sumatra 44, 45, 45; while the few Sarawak birds we have examined have a wing range of 44-46 mm. This new race has a larger bill than *a. atrigularis*.

Type. Adult ♂, collected on Siantan Island, Anamba group, 5 Sept. 1925. Total length 120, wing 48, tail 38, bill from gape 19.

Like most of the resident birds in the Anamba group this species differs from the mainland form in its slightly larger size but the difference in size is sufficiently marked, especially so considering the long series examined, to merit recognition. All the birds obtained by Abbott and

Kloss and reported upon by Oberholser were moulting and wing measurements therefore not possible. *O. major* extends to the Tioman Archipelago.

Natunas, *Orthotomus atrigularis*, Hartert.

43. *Phylloscopus borealis xanthodryas* Swinhoe.

Siantan, ♂ 63.5; 2 Oct.

Jimaja, ♂ 16.5; 10 Oct.

Natunas, *Phylloscopus borealis*, Hartert.

44. *Lanius tigrinus* Drap.

Siantan, ♂ 17 Sept.

45. *Lanius cristatus superciliosus* Lath.

Jimaja, ♂ 15 Oct.

46. *Dicrurus paradiseus platurus* (Vieill.).

Dissemurus paradiseus microlophus Oberh., p.59: Pulau Jimaja, Anamba Islands.

Siantan, imm. ♂ 153, 148; ♂ 155, 156, 153; ♀ —, 154.

Very different it is true from the well-crested typical *paradeus* but not in our opinion separable from birds from Singapore, the South of the Malay Peninsula and Sumatra all of which we regard as *platurus* (typ. loc. Malacca).

Natunas, *Dissemurus platurus*, Hartert.

47. *Gracula javana prasiocara* Oberh.

Gracula javana prasiocara Oberh., p. 55; Pulau Piling, Anamba Islands.

Siantan, ♂ 187, 187; ♀ 182, 185, 188.

Jimaja, ♂ 188.

We cannot see the colour distinction attributed to this form, but birds from the Anamba group with a wing range of 178.5-193 (Oberholser measurements) certainly average larger than typical *javana* of Java, 173-185, *fide* Finsch (Notes Leyd. Mus., XXI, 1899, p. 9) or birds from Borneo, 170-188, Sumatra 168-188 and the southern part of the Malay Peninsula 173-185. Large birds also occur in the Tioman Archipelago and the Natuna Islands.

Natunas, *Gracula javana javana*, Stresemann (Nov. Zool. XIX, 1912, p. 314).

Tambelans, *Gracula javana prasiocara*, Oberholser.

48. *Aplonis panayensis heterochlorus* (Oberh.).

Lamprocorax panayensis heterochlorus Oberh., p.57: Pulau Mobur, Anamba Islands.

Siantan, ♂ —, 109; ♀ 110, 104, 105, 106.

These birds scarcely need comparison with *strigatus* of Java for they are even larger than birds from the Malay Peninsula which are *A. p. strigatus* > *affinis*: 23 skins of these latter average 97.9, with a maximum of 104 mm. for the wing.

We cannot appreciate the colour distinctions attributed to this form.

A. heterochlorus extends to the Tioman Archipelago.

Natunas, *Aplonis panyensis strigatus* > *affinis* \approx *panayensis*.
Stresemann (Nov. Zool, XX, 1913, p. 376).

Tambelans, *Lamprocorax panayensis heterochlorus* Oberholser.

49. *Motacilla cinerea caspica* (S.G.Gm.).

Siantan, 1 ex. 26 Sept.

Tambelans, *Motacilla boarula melanope*, Oberholser.

50. *Motacilla flava simillima* Hartert.

Siantan, ♂ 81, 83,—; ♂ imm.; 16 Sept.—3 Oct.;
♀ —, 15 Sept.

One adult ♂ and the ♀ are similar in plumage. Both have a broad white supercilium, the crown grey with a greenish cast and the ear-coverts greyish. The other ♂ approaches *taivana* in that the supercilium is tinged with yellow and the head more strongly washed with olive: in this bird also the ear-coverts are more olive than grey but as the head is partly grey we put the specimen under *simillima*. The immature bird is whitish below and brown above.

Natunas, ? *Motacilla flava*, Hartert.

51. *Aethopyga siparaja siparaja* (Raffles).

Aethopyga siparaja ocbropyrrha Oberh., p. 65; Pulau Rittan, Anamba Islands.

Siantan, ♂ (ad.) 50.5,—, 52, 51, 52: 2 ex ?; 5 ♂ vix. ad.; 4 ♀.

Jimaja, ♂ (ad.) 53.5, 52.

We can detect no essential differences between the above birds and a series from Sumatra, the Malay Peninsula and Borneo.

The Anamba males differ from the majority of the remainder of our series in that the greater wing-coverts are edged with olive; this edging is furthermore, in the majority of cases, tinged with red. These are freshly moulted birds in perfect plumage.

The five changing males have been compared with others in a like phase from the Malay Peninsula.

One of the males obtained on Siantan is in a most interesting state of plumage for it is changing from a very worn dull greenish-grey plumage into the red dress.

The bird presents a very different appearance from that of the young males just showing signs of their adult plumage.

As the Anamba birds are certainly not larger than typical *siparaja* we cannot recognise any Anamba race.

Natunas, *Aethopyga siparaja*, Hartert.

52. ***Anthreptes malacensis malacensis*** (Scop.).

Anthreptes malacensis anambae Oberh., p. 61: Pulau Mobur, Anamba Islands.

Siantan, 8 ♂ ; 6 ♀ .

We cannot separate these birds, sex for sex, from a very large series from the Malay Peninsula. In the case of the females it is essential that only newly moulted birds should be compared for abrasion and "bleaching" in this species, particularly in coastal districts, causes the greenish plumage to become almost grey on the upper parts.

Natunas, *Anthreptes malacensis*, Hartert.

53. ***Dicaeum trigonostigmum trigonostigmum*** (Scop.).

Dicaeum trigonostigmum hypochlous Oberh., p.67: Pulau Siantan, Anamba Islands.

Siantan, 2 ad. ♂ ; 3 ♂ in change; 1 ♀ .

Jimaja, 1 ad. ♂ .

We cannot separate these birds from *trigonostigmum* of the Malay Peninsula.

Natunas, *Dicaeum trigonostigma megastoma* Hartert (Bull. B.O.C. XXXVIII, 1918, p. 74).

Spolia Mentawiensia: Notes on some Fishes.

by N. SMEDLEY, *M.A.*

The expedition of 1924 was mainly concerned with the systematic investigation of the land fauna. Very little marine collecting was therefore attempted, neither apparatus nor skilled collectors being available. The results are admittedly scanty and are only recorded on account of the general interest attaching to the islands from which the collections were made.

Of the few fishes obtained, all but one (*Pterois*) were found swimming close inshore, or, in the case of the mud-skipper, hopping about amongst the pools at low-tide, and were obtained by shooting.

The east coast of both islands is fringed by a reef of coral, behind which lies mangrove with brackish pools and streams. This merges gradually into the swamp jungle with which each island is covered.

HEMIRHAMPHIDAE.

Zenarchopterus dispar. (Cuv. & Val.).

Weber and de Beaufort. Fishes of the Indo-Australian Archipelago, vol. iv, 1922, p. 169, & synonymy.

3 ♂♂, Sipora. The largest is 155 mm. in length, or practically full-grown.

This fish had been previously recorded from the West of Sumatra and the neighbouring islands of Simalur, Engano, Nias and the Batu Islands. It ranges from Madagascar to New Guinea.

SCORPAENIDAE.

Pterois radiata. Cuv. & Val.

Day, Fauna of British India, Fishes, vol. ii, 1889, p. 63. (see synon.).

A single specimen from Sioban, Sipora, October 1924, obtained by Dr. H. H. Karny and presented to the Raffles Museum.

The markings when fresh were as given by Day, but the following details were noted. The general body colour was very dark, almost black. The caudal peduncle was reddish, as were also the prolongations of the rays. Ventrally in the region of the mouth and gills, backward almost to the base of the pelvic fins the colour was yellowish-white, the markings in that region being pink and white.

GOBIIDAE.

Mud-skippers were common on the shores and reefs of both islands. All those collected belonged to the same species.

Periophthalmus koelreuteri (Pall.).

Day, Fauna of British India, Fishes, vol. ii, 1889, p. 280.

The fin counts in this species seem to be very variable. The ventrals of Mentawi specimens are united for nearly half their length.

Siberut. Several specimens were collected on the shore and reef at low tide and from the brackish streams and pools amongst the mangrove.

Sipora. The shores of the bay of Sioban provided a collecting-ground similar to that of Siberut, but brackish pools were few, the greater number of the specimens being obtained from the fringing reef at low tide.

From both islands the largest specimens collected were 100 mm. in length. Several larger adults of roughly 200 mm. were seen hiding under loose boulders of coral in pools on the reef, but attempts at collecting them were unsuccessful.

ELEOTRIDAE.

Eleotris porocephalus, Cuv. & Val.

Day, l.c.s., p. 289. (See reference to synonymy). A single specimen was obtained from the bay of Sioban, Sipora. Another fish obtained at the same time was too much damaged for certain identification but may belong to this species.

The apparent absence of other common *Gobioid* shore fishes seems worthy of note. No specimens of other spp. of *Periophthalmus* or of *Boleophthalmus* spp. were seen, though systematic collecting might bring them to light. The shore fauna of the Mentawi Islands should repay further investigation, in view of the apparently isolated position of the group.

Notes on Paradise Flycatchers in Malaysia.

By F. N. CHASEN AND C. BODEN KLOSS.

(Records of the Raffles Museum, No. 32).

Several races of Paradise Flycatchers are to be met with in Malaysia. Two are winter visitors:—*Terpsiphone atrocaudata* which breeds in Japan; and *Terpsiphone paradisi incei* which breeds in China: the remainder comprise several races which are typified locally by the form *affinis*.

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The first, *atrocaudata* (with its most southern subspecies (?) "*Callaeops*" *periophthalmica* Grant, of the Philippines), is very distinct and the males never assume a black-streaked white-plumage.

There is no certainty, but generally no great difficulty in separating the immigrant *incei* from the resident *affinis* section in the brown-backed plumages; but there has been considerable doubt in allocating the adult males in their black and white dress to one or other of the sections—*incei* or *affinis*.

It cannot be satisfactorily done on colour in this phase, but we find that size is a useful guide and as colour is a fairly reliable indication to the sections to which birds in the brown-backed plumage belong if we first place these in groups by colour and then find the measurements of the groups we should be able by their size to make an allocation of the black and white males.

Taking brown-backed long-tailed examples of *incei* which have shining black forenecks sharply margined from the grey breasts and darker, maroon glossed mantles we get the following measurements:—

Wing	86-93 millimetres.
First primary (tip to tip of primary coverts)	11-15 "
Bill (tip to front edge of nostril)	12-13 "

In *affinis* of the Malay Peninsula, a bird of which the long-tailed brown-backed male has the foreneck concolorous with the grey breast and a paler, chestnut mantle, the dimensions are:—

Wing	92-97 millimetres.
First primary	15-20 "
Bill	14-15 "

Of the black and white males we have at the moment as follows from the Malay Peninsula:—

a. Eleven examples.

Wing	88-92 mm.
First Primary	12-15 "
Bill	12-13 "

These on dimensions we regard as *incei*.

b. Fourteen specimens.

Wing	93-98 mm.
First primary	15.5-19 "
Bill	14-16 "

These by size we regard as *affinis*.

The bills of *affinis*, apart from being longer, are much broader and more flattened than in *incei*.

Now we are left with a considerable assemblage of short-tailed brown-backed individuals more difficult to place definitely because many of them are immature birds: but those combining the three characters of smaller bills, shorter wings and dark (but not glossy) throats with an obvious (but not marked) margination are undoubtedly examples of *incei*.

It seems safe to regard as *affinis* practically all the rest though there are a few which defy allocation. Amongst the assemblage are a small number with paler, more cinnamon upper parts of much the same colour as the Bornean form: these are perhaps immature individuals.

As far as Malaysia is concerned distinctions are only required amongst birds coming from the Peninsula and Sumatra.

T. p. incei is not recorded from Borneo, Java, etc. Its migration route seems to be mainly a landward one down the coast of China whence it travels south-westwards. Our most northern specimens come from Junk Seylon Island.

Terpsiphone paradisi falls into two sections:—One, in which brown-backed birds assume a glossy black foreneck, containing *turkestanica* Turkestan.

leucogaster Afghanistan through the Himalayas to Assam north of the Brahmaputra.

paradisi India to the Bay of Bengal and Ceylon: *ceylonensis* Zar. and Härms is "a very distinct form" according to Hartert (Bull. B.O.C., XXXVI, 1916, p. 75)

nicobarica Nicobar and Andaman Islands.

incei China, migrating southwards to the Malay Peninsula and Sumatra but not yet recorded from Borneo or Java.

The other section comprises forms in which brown-backed birds never assume the black foreneck. In it are

affinis Sumatra and the Malay Peninsula to Assam south of the Brahmaputra, Yunnan, French Indo-China.*

borneensis Borneo.

procera Simalur Id., W. Sumatra.

insularis Nias Id., W. Sumatra.

subsp? Java.

There is no need to give these two sections specific rank because brown-backed birds of the northern and western races acquire a black throat while the Malaysian forms do not: all the black and white males have black throats.

* Bourns and Worcester in M.S. give *Terpsiphone affinis* for the Philippines "with some doubt on the strength of a specimen mentioned by Hartert" (vide McGregor, Manual Philippine Birds, 1909, p. 465).

Then in the lesser Sunda Islands to the east of Malaysia occur two forms *T. p. floris* (Sumbawa, Flores, Alor) and *T. p. sumbaensis* (Sumba Id.). We have only seen the latter, but according to Hartert it is only in the old males that any differences between it and *floris* can be perceived. They are then black-throated birds in the brown phase, closest to *borneensis* otherwise, but with less grey on the breast. They are large forms with wings sometimes exceeding 100 mm. In the black and white phase of *sumbaensis* the black element is much reduced except on the head: the wings are largely white. On account of their glossy black throats these birds belong to the *paradisi* section.

Some Notes on Malaysian Waders.

By F. N. CHASEN AND C. BODEN KLOSS.

(Records of the Raffles Museum, No. 33).

A. An addition to the Avifauna of the Malay Peninsula:

Tringa incana brevipes (Vieill.).

Tringa incana brevipes (Vieill.) occurs in Malaysia on migration: it has been recorded from C. Annam, Borneo, Sumatra, Java and the Natuna Islands (four specimens in the Raffles Museum taken in April 1909) but it appears to be as yet unknown from the Malay Peninsula, Tenasserim and Siam.

We have to record it from the mud-flats less than five miles from the Southern coast of Singapore, whence we have two specimens collected in September 1923.

Measurements:—3 ♂, wings 163-168; culmen 37-40; tarsi 32-33; 3 ♀, wings 163-168; culmen 38-40; tarsi 33-34 mm.

"Bill slaty brown, feet dull yellow"

This sandpiper forms one of a small group of waders, known to occur in Borneo, or the Natuna Islands, but not in the Malay Peninsula: others are the Dunlin, Knot and Sanderling.

B. Extension of Range of *Numenius cyanopus* Vieill.

In 1923 (Journ. F.M.S. Mus., VIII, 1923, p. 356) Robinson and Kloss omitted this species from the list of Sumatran birds although included in the birds of that island by Vorderman.

We now have an example of this species from a small island (Pulau Moro) in the Durian Strait of the Rhio Archipelago, less than 40 miles from Singapore, and the species is therefore tolerably certain to occur in Sumatra; and very possibly in the Malay Peninsula, especially on the south-eastern coast.

C. An Aberration of *Rostratula benghalensis benghalensis* (Linn.).

A female painted snipe collected on Singapore Island in November 1927 differs from others of the same sex from various parts of the Malay Peninsula in that the rufous colour of the head and neck is very much reduced in extent, thereby approaching *R. australis* Gould.

The feathers of the throat and foreneck are margined with black, the lores are dusky and the sides of the head and neck are blackish only very faintly washed with rufous: on the hind neck the rufous patch is only just discernible.

The Singapore bird is also rather darker above than other females, but in its other characters it seems typical of *benghalensis*.

"Bill pale slaty-olive, brown at the tip; feet pale olive."

Birds from Mt. Benom, Pahang; the Kledang Hills, Perak; and the Islands of Penang, Tioman and Aor.

By F. N. CHASEN AND C. BODEN KLOSS.

(*Records of the Raffles Museum No. 34*).

The birds listed below were obtained from Gunong Benom by Mr. I. H. N. Evans of the F.M.S. Museums: from the Kledang Hills by Mr. E. Seimund of the F.M.S. Museums, from Penang by Mr. F. N. Chasen of the Raffles Museum, and from Tioman and Aor by Mr. N. Smedley of the Raffles Museum, Singapore.

Gunong Benom, 6916 ft., is in Western Pahang: it is entirely surrounded by low land and is of the same formation as the Main Range (granite, etc.), but between the two occur the quartzite and shales of the Raub series which are found again to the eastward and include Mt. Tahan.

Mr. I. H. N. Evans made his ascent in March 1923 and obtained a few birds which are the first to have been secured from the higher levels. They are similar to those found at equal altitudes on Tahan and on the Main Range to the west.

The **Kledang Hills** have not been examined for birds before. They attain a height of about 2,600 ft. and have the valley of the Perak River to the west with, on the east, the plain on which is situated the town of Ipoh: northwards a pass of about 700 ft. separates them from the main mountain Massif. They possess no true mountain birds, and though visited in December (1927) the only migrants obtained other than the usual warblers and king crow were the swallow *D. u. dasypus* and the flycatcher *C. r. anak*, which probably breeds in Yunnan. Their resident avifauna is normal.

Penang Island attains a height of 2,700 feet and the species listed below were obtained near its summit in December 1927. The scanty notes on the birds of the island published hitherto probably refer to species secured in the lowlands. The late Mr. C. J. Wilson, O.B.E., made some collections in recent years on the Peak, but, to the best of my recollection, they included nothing of importance which is not now listed. We find nothing unexpected in the Penang avifauna: the thrush, warblers and shrike are common winter visitors.

The islands of **Tioman** and **Aor** lie near the southern extremity of the Malay Peninsula off the coasts of Pahang and Johore. Tioman is of some size, lofty (3,400 ft.) and forested: Aor (about 1,200 ft. high) and its satellite Dayang are small, planted with cocopalms, or under secondary growth though some little true forest remains on the elevated interior.

Both have been collected on previously (Abbott, Kloss, Robinson) but the only published list of birds is one of twenty-seven species from Tioman (Kloss, Journ. Straits Br., R. Asiat. Soc. No. 45, 1905, p. 280). *Corythocichla leucosticta* is perhaps the most interesting occurrence on the island: *Stachyris tionis* is a well-marked insular race, and the tailor-bird (*Orthotomus*) has also become differentiated from the mainland form. The birds listed were obtained in April and May; those from Tioman were mostly secured at about 1,000 ft., but a few came from higher localities. C. Boden Kloss.

Mt. Benom, Pahang.

- Otus spilocephalus vulpes* (Grant).
- Cyanops franklini minor* Kloss & Chasen.
- Dendrobiastes hyperythra malayana* Grant.
- Muscicapula melanoleuca westermanni* Sharpe.
- Niltava grandis decipiens* (Salvad.).
- Rhipidura albicollis atrata* Salvad.
- Cryptolopha trivirgata parvirostris* (Strickl.).
- Pericrocotus montanus montanus* Salvad.
- Iole tickelli peracensis* Hart. & Butler.
- Trochalopteron melanostigma peninsulæ* Sharpe.
- Alcippe cinerea cinerea* Blyth.
- Stachyridopsis chrysaëa chrysops* (Richmond).
- Sibia picaoides wrayi* Grant.
- Siva strigula malayana* Hartert.
- Pseudominla castaneiceps soror* Sharpe.
- Pteruthius flaviscapis aeralatus* Tickell.
- Pteruthius aenobarbus tahanensis* Hartert.
- Pnoepyga squamata harterti* Rob. & Kloss.
- Bhringa remifer peracensis* Baker.
- Aethopyga saturata wrayi* Sharpe.

Kledang Hills, Perak.

- Ducula badia badia* (Raffles). 1 ♂.
 - Nyctiornis amicta* (Temm.). 1 ♀.
 - Caprimulgus indicus jotaka* Temm. and Schleg. 1 ♂.
 - Tachornis battassiensis infumatus* (Scl). 1 ♂.
 - Collocalia brevirostris innominata* Hume. 4 ♂.
 - Collocalia esculenta cyanoptila* Oberh. 2 ♂.
 - Hemiprocne comata comata* (Temm.). 1 ♀.
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Pyrotrogon duvauceli (Temm.). 1 ♂.

Zanclostomus javanicus pallidus Rob. and Kloss. 1 ♂, 1 ♀.

Rhinorhiza chlorophaea chlorophaea (Raffles). 1 ♂.

Calorhamphus fuliginosus hayi (J. E. Gray). 4 ex.

Chotochea chrysopogon laetus Rob. and Kloss. 5 ex.

Chrysocolaptes validus xanthopygius Finsch. 1 ♀.

Calyptromena viridis continentis Rob. and Kloss. 2 ♂, 1 ♀.
Wings, ♂ 101, 101; ♀ 103 mm.

Delichon urbica dasypus (Bp.). 1 ♀ (?).

This specimen is very similar to that obtained in Negri Sembilan (vide Journ. Malayan Br., R. Asiat. Soc., II, 1924, p. 70) only differing in being rather whiter on the abdomen.

This is the second specimen recorded from the mainland of the Malay Peninsula. Wing, 101 mm.

Hemichelidon sibirica sibirica (Gm.). 2 ♂, 2 ♀.

All with the first primary shorter than the wing coverts.

Alseonax latirostris (Raffles). 1 ♂.

Cyornis rubeculoides anak Rob. and Kloss. 1 ♂.

We now suspect that *anak* is the *glaucopterus* of Thayer and Bangs in winter habitat. Wing, 75.5 mm.

Hypothymis azurea prophata Oberh. 2 ♂, 1 ♀.

Dryophila velata caesia (Less.). 1 ♂, 1 ♀.

Culicicapa ceylonensis ceylonensis (Swains.). 1 ♂.

Pericrocotus speciosus xanthogaster (Raffles). 1 ♂, 4 ♀.

Wings, ♂ 86; ♀ 82, 85, 85, 88 mm.

These birds seem nearer to *xanthogaster* than to *flammiifer*.

Chloropsis viridis zosterops Vig. 2 ♀.

Chloropsis cochinchinensis icterocephala (Less.). 2 ♂, 1 ♀.

Irena puella cyanea (Beggie). 3 ♂, 2 ♀.

Ixos cinereus cinereus (Blyth). 5 ex.

Iole olivacea olivacea Blyth. 1 ♂.

Pycnonotus brunneus brunneus Blyth. 1 ♂.

Pycnonotus simplex simplex Less. 1 ♂.

Pycnonotus erythrophthalmus erythrophthalmus Hume. 1 ♂.

Alcippe cinerea cinerea Blyth. 4 ♂, 2 ♀.

Pomatorhinus montanus occidentalis Rob. and Kloss. 1 ♂.

Malacopteron magna (Eyton). 1 ♂.

Malacopteron magnirostris magnirostris (Moore). 1 ♂.

Anurophasis malaccensis malaccensis (Hartl.). 1 ♂.

Cyanoderma erythroptera erythroptera (Blyth). 1 ♀.

- Mixornis gularis pileata* (Blyth). 3 ♂.
Macronus ptilosus ptilosus Jard. and Selb. 2 ♂, 3 ♀.
Larvivora cyane cyane (Pall.). 2 ♂.
Orthotomus atrigularis atrigularis Temm. 2 ♀.
Phylloscopus borealis borealis (Blas.). 3 ♂.
Phylloscopus borealis xanthodryas Swinh. 2 ♀.
Lanius tigrinus. 1 ♀.
Tephrodornis gularis fretensis Rob. and Kloss. 1 ♀.
Hemipus picatus (Sykes). 3 ex.
Dendrophila frontalis saturator (Hartert). 1 ♂.
Dicrurus annectens (Hodgs.). 1 ♂.
 Wing, 143 mm.
Aethopyga mystacalis temmincki (Mull.). 1 ♂.
Leptocoma brasiliana brasiliana (Gm.). 1 ♀.
Anthreptes rhodolaema rhodolaema Shelley. 1 ♀.
Arachnothera affinis modesta (Eyton). 1 ex.
Dicaeum trigonostigma trigonostigma (Scop.). 1 ♂.
Prionochilus percussus ignicapillus (Eyton). 2 ♂.
Prionochilus maculatus maculatus (Temm.). 1 ♂, 1 ♀.
Dicaeum concolor olivaceum Wald. 1 ♂, 1 ♀.
Zosterops aureiventer aureiventer Hume. 1 ♂.
 (Syn. *Z. tahanensis* Grant.)

Penang Hill.

- Treron curvirostra curvirostra* (Gmel.). 1 ♂.
 This species was also collected in Penang by the late C. J. Wilson in 1923: his specimens are in the Raffles Museum.
Cacomantis merulinus querulus Heine. 1 ♀.
 Wing, 109 mm.
Alseonax latirostris (Raffles). 1 ♀.
Hypothymis azurea prophata Oberh. 2 ♂.
Dryophila pyrrhoptera pyrrhoptera (Temm.). 1 ♂.
Aegithina viridissima viridissima (Bp.). 1 ♂.
Irena puella cyanea (Begbie). 1 ♂.
Iole olivacea olivacea Blyth. 1 ♂.
Brachypodius atriceps atriceps Gm. 2 ♂, 2 ♀.
 Very common on Penang Hill.
Tricholestes criniger criniger (Blyth). 1 ♂, 1 ♀.
Pycnonotus plumosus plumosus Blyth. 2 ♀.
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- Pycnonotus brunneus brunneus* Blyth. 2 ♂.
Alcippe cinerea cinerea Blyth. 8 ♂, 3 ♀.
Stachyris nigriceps davisoni Sharpe. 3 ♂.
Turdus obscurus obscurus Gm. 2 ♂, 2 ♀.
Orthotomus atrigularis atrigularis Temm. 3 ♂, 1 ♀.
Phylloscopus borealis borealis (Blas.). 2 ♂.
Phylloscopus borealis xanthodryas Swinh. 4 ex.
Phylloscopus inornatus inornatus (Blyth). 1 ♀.
Lanius tigrinus Drap. 1 ♀.
Dissemurus paradiseus malayensis (Blyth). 2 ex.
Munia acuticauda acuticauda Hodgs. 1 ♂.
Aethopyga siparaja siparaja (Raffles). 1 ♂, 1 ♀.
Leptocoma brasiliana brasiliana (Gm.). 9 ♂, 6 ♀.
 Very common on Penang Hill.
Leptocoma jugularis flammaxillaris (Blyth). 1 ♀.
Arachnothera chrysogenys chrysogenys Temm. 1 ♀.
Arachnothera longirostris subsp. 1 ♂, 1 ♀.
Dicaeum cruentatum ignitum (Begbie). 1 ♂.
Dicaeum trigonostigma trigonostigma (Scop.). 3 ♂, 2 ♀.

Islands of Tioman and Aor.

- Treron vernans* subsp. Tioman, 1 ♂; Dayang, 2 ♂, 1 ♀.
 These birds are rather large: the Tioman ♂ measures 160 and the Dayang birds, ♂ 148, 149, ♀ 147 mm. in wing length.
 The Tioman bird should be placed with *adina* Oberh. from the Anamba Islands.
Ptilinopus jambu (Gm.). Tioman, 1 ♀.
Ducula aenea aenea (Linn.). Tioman, 1 ♂; Aor, 1 ♂.
Myristicivora bicolor bicolor (Scop.). Aor, 2 ♀.
Charadrius alexandrinus peroni Schleg. Tioman, 1 ♂.
Halcyon chloris humii Sharpe. Tioman, 1 ♂; Dayang, 1 ♀.
 Wings, ♂ 100; ♀ 104.
Tricholestes criniger criniger (Blyth). Tioman, 1 ♂, 1 ♀.
Pycnonotus brunneus zapolius Oberh. Tioman, 3 ♂, 1 ♀.
Stachyris nigriceps tionis Rob. and Kloss. Tioman, 1 ♂, 1 ♀.
 Two more examples of this recently described race (antea, vol. XIII, 1927, p. 211) confirm the original diagnosis. Wings. ♂ 63, ♀ 58.

Cyanoderma erythroptera erythroptera (Blyth). Tioman, 1 ♀.

Malacopteron magnirostris magnirostris (Moore). Tioman. 3 ex.

Copsychus saularis musicus (Raffles). 2 ♂.

Kittacincla malabarica tricolor (Vieill.) 1 ♂, 1 ♀.

The male is paler below than any of our series from the southern part of the Malay Peninsula: the female is perhaps a shade darker on the crown and mantle than typical *tricolor*.

Orthotomus atrigularis major Chas. and Kloss. 2 ♂, 2 ♀ (imm.).

Wings, ♂ 48, 49 mm. These rather large birds should be placed with the Anamba Islands race.

Dissemurus paradiseus platurus (Vieill.). Tioman. 5 ex.; Aor, 5 ex.

We cannot separate birds from the southern part of the Malay Peninsula, Singapore and adjacent islets, the islands of the Tioman Archipelago and the Anamba Islands.

Gracula javana prasiocara Oberh. Tioman, 5 ex.; Aor, 5 ex.

Wings, Tioman 186, 186, 190, 190, 192; Aor 177 (vix. ad.), 182, 184, 188, 195 mm.

Like birds from the Anamba Islands those from the Tioman group average large.

Aplonis panayensis heterochlorus (Oberh.). Tioman, 1 ex., Dayang, 6 ex.; Aor, 7 ex.

Wings ♂, Dayang, 102, 105, 105, 105, 112 mm; Aor, 103, 104, 104, 105, 106, 107, 110 mm.

Leptocoma brasiliana brasiliana. Tioman, 1 ♂, 2 ♀.

Not separable from *brasiliana*: *eumecis* has been described from the Anamba Islands by Oberholser but we have not seen this form.

Leptocoma jugularis ornata (Lesson). Dayang, 2 ♂.

Anthreptes malaccensis malaccensis (Scop.). Tioman, 3 ♂, 3 ♀.

Some Reptiles and Amphibia from the Anamba Islands.

by N. SMEDLEY, M.A.

(Records of the Raffles Museum No. 35)

Whilst most of the islands of the South China Sea have received the attention of herpetologists, no list appears to be extant of the reptiles and amphibians of the Anamba Islands. Faunistically, these islands form an outpost of Malayan territory, whilst their near neighbours the Natunas show, in those groups which have been recorded, a closer affinity with the Bornean fauna. I have accordingly considered it worth while to record the results of two small collections made in Aug. Sept. 1925 by Mr. F. N. Chasen, Curator of the Raffles Museum, and in April, 1928 by Mr. M. R. Henderson, Curator of the Herbarium, Botanic Gardens. The list comprises only a few of the commoner species, but in both cases the specimens taken were merely supplementary to larger collections of a different nature. Field-notes by Mr. F. N. Chasen have been incorporated. Dr. Malcolm Smith kindly identified the Amphibia. In all cases I have used the same nomenclature as in de Rooij's "Indo-Australian Reptiles" in view of the fact that the question of priority will shortly be dealt with in detail by Dr. Smith.

REPTILIA.

Lacertilia.

Gonatodes kendalli (Gray)

Pulau Siantan, 3, (F.N.C.) The following notes were made in the field on two examples:—

1. Greyish-green above, blotched with brown; brighter green before the eyes. Light rings on tail greyish-white; dark rings greenish-brown. Below whitish. Distinct large brown spots on head and shoulders.

2. Chiefly dark brown above; large oval spots on neck, nape and shoulders and no green anywhere. (F.N.C.)

Hemidactylus frenatus D. & B.

Pulau Siantan, 1, (F.N.C.)

Gehyra mutilata (Wiegman)

Padang, Pulau Jimaja (on coconuts,) 1, (M.R.H.)

Gecko verticillatus Laur.

Letong, Pulau Jimaja, 1, (M.R.H.). The variety with red spots on the ventral surface.

Draco volans L.

Letong, Pulau Jimaja, 3 ♂, (M.R.H.); nr. Terempa, Pulau Siantan, 1 ♀, (M.R.H.); Pulau Siantan, 1, (F.N.C.)

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***Galotes cristatellus* (Kuhl.)**

Letong, Pulau Jimaja, 3, (M.R.H.); Pulau Siantan, 2, (F.N.C.)

***Acanthosaura armata* (Gray.)**

Pulau Siantan, 1, (F.N.C.)

***Varanus nebulosus* (Gray.)**

Pulau Siantan, 2, (F.N.C.)

***Varanus salvator* (Laur.)**

This species was not contained in the collections, but Mr. F. N. Chasen reports that large specimens are common on the small island of Ringi. Mr. Henderson saw this lizard on Pulau Jimaja.

***Mabuia multifasciata* (Kuhl.)**

Pulau Siantan, 4, (F.N.C.)

***Lygosoma olivaceum* (Gray.)**

Letong, Pulau Jimaja, 1, (M.R.H.)

***Lygosoma quadrivittatum* Peters.**

Pulau Siantan, 1, (F.N.C.)

Ophidia.

***Python reticulatus* (Schn.)**

No specimen was obtained, but Mr. Henderson saw a specimen on Jimaja which he calculated as at least 12 feet in length lying coiled at the foot of a tree.

***Tropidonotus chrysargus* Schl.**

Pulau Siantan, 1, (F.N.C.) This specimen agrees with two others in the Raffles Museum in having a whitish, black-edged spot on each parietal. The creamy-white V-shaped collar is strongly marked.

***Dryophis prasinus* Boie.**

Pulau Siantan, 1 green, 2 grey, (F.N.C.); Telok Padang, N.E. Jimaja, 1 green, Gunong Datoh, Pulau Jimaja (c. 800 ft.), 1 grey, (M.R.H.).

Chelonia.

***Chelonia mydas* (L.)**

Mr. Chasen reports turtle beaches on Pulau Durai.

AMPHIBIA.

***Rhacophorus leucomystax* (Kuhl.)**

Pulau Siantan, 41, (F.N.C.)

***Bufo melanostictus* (Schn.)**

Pulau Siantan, 7, (F.N.C.)

A Visit to some Islands off the East Coast of Johore and Pahang.

by H. GORING DALTON.

(Plates XXIII-XXIV)

From the East Coast of Johore can be seen a small group of Islands, some near to the coast, others lying about 40 miles out in the China Sea.

Most of these are in Johore territory, but a few are just within the boundary of the neighbouring State of Pahang.

For about four or five months of the year these Islands are very difficult to approach owing to the violence of the N.E. Monsoon and they are very little known to residents on the mainland.

They receive occasional visits from Government Officials but to the ordinary traveller up and down this coast who catches sight of lovely peaks and coral beaches they remain *terra incognita*.

I was fortunate in obtaining 11 days leave in May 1918 and having a sea-going motor-launch put at my disposal I decided to visit as many of these Islands as time would permit. A cargo boat was hired in which to stow the oil for the motor-boat, provisions and any specimens we might collect. I was most fortunate in my choice of a crew of 10 who proved sufficient for all my requirements.

Pilots had to be engaged who were familiar with the approaches to the islands. This was most important as many places which appeared suitable for mooring were actually dangerous owing to submerged rocks and coral reefs. With the exception of the motor driver and my boy there was no definite work consigned to anyone.

Crews of the 2 boats were changed as occasion required and the whole party worked well together.

Miscellaneous articles consisting of axes, parangs, fishing-lines and casting-net, hurricane lamps, butterfly nets, rope, cameras, medical stores, etc., were carried.

We left the wharf at Mersing at 5.20 a.m. on the 21st May 1918 and soon reached the mouth of the Mersing river.

By the time we crossed the bar it was broad daylight and we travelled through a glassy sea passing a few sailing boats on their way to fishing grounds, whilst far away, silhouetted against a blazing golden sky were stretched out the islands we were about to visit. Pulau Tioman looked particularly fine, standing up a dark blue mass with its peaks partially hidden in white clouds.

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Rocks on East Beach, Pulau Babi.

When well clear of the channel which cuts the bar of the river we steered northwards skirting the coast line, past Pulau Stendan on our way to Kuala Endau which, although on the mainland, I was anxious to visit.

The islands were stretched out in a lovely panorama from Pulau Sribuat to the north to Pulau Tinggi lying far away to the south. It was a blue day, sky, sea and mainland all being tinted with various shades of blue, whilst far away on the horizon white clouds were visible tinged with a shade of orange pink, a sure sign of heat.

The coast line we were passing was very rocky and in many places steep headlands rose up sheer from the sea.

At intervals were little sandy beaches with coconut groves as a back ground. Most of the hills were covered with jungle, but here and there were clearings which had been allowed to grow wild, with lallang grass predominating.

We passed Tanjong Risang and shortly afterwards at 8.0 a.m. turned into a sandy bay just to the south of Tanjong Penyabong, where we anchored in about 5 feet of clear water and sent the prau inshore to fill up the breakers with drinking water. We left again at 8.30 a.m. and in half an hour, passing between Pulau Tengah and the mainland we sighted Penyabong with its big saw-mill belonging to the Endau Development Company. This mill comes on one as a surprise, with its great factory chimney and double storey factory building of galvanised iron standing up behind a wooden pier, whilst on small hills round about are bungalows used by the members of the staff. This venture proved a failure and I believe most of the buildings have been dismantled.

We left Penyabong behind us and passed along a low lying coast, with long stretches of sandy beach until we reached Kuala Endau. The tide was low but we followed up a long channel marked by stakes until we arrived in the river. The Endau river here forms the boundary between the States of Pahang and Johore. We moored our boats at the Government Wharf on the Johore side and landed. Close to the wharf was a small Customs Office and near to this adjoining a small padang was an old Rest House. There were 3 roads in the place with shops and houses on each side, running parallel with the river, and two other roads, one facing the Wharf, running at right angles into the interior. I first strolled down the main road to the right. One or two Chinese and a few Malay shops, all in a state of dilapidation were passed, their owners sitting in the doorways chewing betel-nut or smoking, but as far as I could see doing no business.

I wondered where the population might be for we met hardly anyone on this hot dusty road.

I was shown the houses of a few of the important people. At the end of this road was a house much larger than the others and railed in by a palisade. This I was told belonged to H.H. the Sultan of Johore.

We saw a few signs of life here, but as the road entered a coconut plantation we turned back. There were several narrow lanes between the houses which led down to the river. I walked down one and found myself in the midst of platforms for drying fish. The smell was awful, and I returned to the boats.

After tiffin I took a walk further inland. On the way we passed the Police Station and School. A little further on was a well-built Court house, but I was told that this was not used now; all the cases being tried in Mersing. Near by were the ruins of the Magistrate's house which had been occupied about two years before, but which was now almost lost in tall lallang grass and belukar. Many houses and small plantations were passed, all in the same state of neglect while nature was rapidly blotting out all signs of Man's handiwork. Here and there we found an isolated house with a family of Malays, but the dirt and general decay were sad to see. In one house we visited were several children, weedy in appearance and all sick with fever. The refuse of months lay unburied around and underneath the house.

We returned to the Wharf by a different path which led us close to a sharp bend in the Endau river, which appeared to be about 400 yards wide at this point.

A Government Rest House was in course of erection, which seemed strange where everything was falling into ruins. I believe this was to be a resting place for Officials who had Mines and other interests to visit further up the river. Continuing our walk we came upon an attap boat house in which were 2 praus belonging to H.H. the Sultan of Johore. They were painted black, with narrow gold lines running the length of the boat. Over the stern sheets were white canvas awnings which helped to give these boats a very smart appearance.

On arriving at the Wharf we found that a stiff breeze had sprung up with the incoming tide making the water rather choppy. We shoved off at 3.0 p.m. and this was the last time we touched the mainland until our return to Mersing 10 days later.

It was a relief when Endau was left behind, for the general decay which one met on all sides had a most depressing effect and it was with pleasure that we gazed on the islands ahead of us which looked so beautiful as they lay stretched before us in various shades of blue and mauve.

Passing between Pulau Layan and Pulau Kaban we came into deeper water. On Pulau Kaban the rocks had the appearance of tall columns like so many organ pipes, all of a deep red colour. we were not close enough to get a very definite idea as to their

structure. We were now in Pahang waters, skirting just a little north of the boundary line between Pahang and Johore on our way to Pulau Sribuat where we intended staying the night.

Sea-birds passed constantly to and fro over us and we disturbed shoals of fish which would leap considerable distances out of the water to escape us. We saw a species of flying fish.

By 6.0 p.m. we were in close proximity to Pulau Sribuat. There are 2 main islands here, Pulau Sembilang and Pulau Sribuat. They consist of low hills covered with vegetation with a fringe of rocks at intervals along the shore.

We had to skirt the Southern shores of these islands to find suitable anchorage. In doing so we saw a bungalow, half hidden by vegetation, which I was told belonged to the H.H. the Sultan of Pahang.

We entered a sheltered sandy bay where the water was as clear as crystal showing us a sandy bottom, though here and there were dark patches which turned out to be rocks. One of these we bumped somewhat violently but without damage so passed on until quite close inshore where we dropped anchor.

It was now almost dark but we could make out that a small stream ran into this bay which was fringed on either side by mangroves, though immediately opposite where we lay was a small sandy beach above which was a group of coconut palms. There was a small house half hidden amongst these, otherwise the island seemed deserted.

We decided to cook our evening meal ashore so trips were made to and fro in the prau with the necessary articles.

I landed with the first party to explore the beach while food was being prepared. This beach was composed of a very coarse sand formed by broken pieces of coral. Coral remains were found everywhere, all bleached by the sun to a dazzling white. With the help of our coconut palm leaf torches, we found a few shells.

The mosquitoes on this beach were so numerous and vicious, giving one no rest even when sitting close to a smoky fire that I returned to the motor boat to have my dinner in peace.

The moon had risen flooding the whole scene with a pale light, a fire burnt merrily on shore, around which were grouped several of the crew preparing the meal, while further away someone, carrying a flaring torch was searching for crabs, the flame from the torch making pretty reflections in the calm sea. Everything was peaceful, the stillness of the night being broken only by a low murmur of voices from those on shore or the far away sound of breaking surf on some exposed point of the island.

I had brought a mosquito net which proved useless for we were attacked viciously by sand-flies which were able to pass through the mesh of the net. These made sleep impossible and shortly afterwards the tide went out leaving us high and dry on:

the sand. The boats of course heeled over to an impossible angle and as we had not prepared for such an event by bringing props, and as one could not even lie on the thwarts of the boats we started a crab-hunt which although rather amusing was singularly unsuccessful.

Early in the morning rain came on with the incoming tide and a strong breeze started up. We returned to the boats which were now afloat and managed to sleep, although drenched by the driving rain.

We turned out at 6.0 a.m. and found a fine fresh-water stream in which we bathed and where we were able to take in a good supply of drinking water.

A few shells were collected here, mostly the large white shell (*Tridacna squamosa* ?) called by the Malays Siput Kima. The shells we found here were most disappointing, they were generally bleached white by the sun and rounded or broken by being washed to and fro amongst the coral.

We had better luck elsewhere though and it was with pleasure that we set out on a now sunny sea towards Pulau Tioman looming up large and blue in the distance.

On leaving the island of Sribuat the boats passed over beautiful coral reefs which we had been unable to see the previous evening.

This was my first glimpse of these wonderful gardens under the sea.

There were many kinds of coral, some resembling antlers and others fans, but the majority were like small shrubs or plants although I cannot think of any botanical specimen that is really like any piece of coral that I saw. Here and there were big boulders covered with coral. These had a sponge-like appearance, each of the holes being filled in by what looked like minute spider's webs.

The colouring although very beautiful was seldom bright. The antler formations were usually a yellowish colour with touches of white at the points. Others were pale shades of purple, green, brown, and a dull red colour though we saw no coral during the whole trip which was at all like the pink coral so frequently exhibited in shop windows, and which I believe is often artificial. Nearly all the fronds were tipped with white but there were no pieces entirely white, this only occurring when the coral has been removed from the sea and bleached in the sun.

We soon passed into deeper water and lost sight of these wonders of the sea but a fishing line was put over the side of the prau and towed astern and this gave us something else to think of as we were depending on our luck in fishing for much of our food supply.

I was sitting in the stern of the motor-boat facing aft so as to obtain a good view of the prau. It was not long before I noticed our chief boatman Awang jump up and start hauling in the line. We reduced our speed at once so as to make less resistance in hauling in the fish which from the struggle going on astern seemed to be a big one. A shout from the prau told us we had slowed down too much causing a slack line which might give it a chance to get rid of the hook. The propellor roared again as we increased our speed and after what seemed an age but can only have been about 2 minutes the fish was hauled aboard.

We had captured a *Tenok* which measured 4 feet but we had no means of weighing him. Half an hour after we hooked another *Tenok*: this fish was larger than the first measuring 4 feet 6 inch in length. He made a glorious fight for freedom after being hauled into the boat and succeeded in knocking down one of the crew much to the joy of everyone else.

Our attention was turned now to P. Tiuman which we were rapidly approaching. Away to Starboard could be seen the jagged spurs of rock known as Chula Naga (Dragon's horns). These rising abruptly from the shore were devoid of vegetation but the rest of the island was thickly covered in jungle, except here and there along the beach where a few Malays had made clearings and planted coconuts and other fruit trees.

About this time, unknown to those of us in the motor-boat, a third fish was caught. This fish was smaller than the other two but gave us much trouble in its capture. The Malays called it Ikan Aya. It is a much prized fish making excellent eating. We were fairly well supplied now with food for 2 or 3 days.

I anticipated that matters as regards fishing would continue as they had started, but owing to rather rough weather and other reasons less accountable we had very little further success after this first and beautiful morning.

A striking feature of the shore we were approaching was the number of enormous boulders lying at the feet of the hill either in or close to the sea.

As we passed into shallower water I was delighted with the sight of the fresh coral reefs below the surface. The water was extraordinarily clear and must have been anything between 30 to 40 feet deep. I noticed here brightly-coloured fish, beautifully marked in blues, greens, yellow and black and often in most curious forms, darting amongst the coral as the shadows of our boats disturbed them. We pushed in nearer to the beach where a sandy bottom showed a safe anchorage. After my experience at Pulau Sribuat I was always careful to choose an anchorage devoid of rocks and coral where possible, so that we should not be tricked again by a falling tide in waters with which we were unfamiliar.

The spot we had chosen was Tekay Bay lying beneath Gunong Tenkoh.

The prau was poled into the beach and the majority of the party landed to prepare tiffin. I amused myself searching for shells along the beach, which was a joy to behold,—a big expanse of clean white sand made up mostly of minute particles of coral which had been pounded and ground by the waves and then bleached in the sunshine.

Several varieties of shells were found and safely stored away. Tiffin was served ashore and as usual consisted of fish curry, with a pineapple to reduce the sting of the chillies which had been used with a lavish hand. All my men were in holiday mood, feeding like fighting-cocks and thoroughly enjoying the life away from any routine or serious work. The Malay is a delightful companion for a holiday where the work is light and he can joke and sing without restraint.

After tiffin I boarded the motor boat and started off in search of a suitable place for securing some coral. The place we chose was Ayer Batang but it proved too deep for the divers so we had a prolonged bathe instead. The island as far as I had seen was very sparsely populated; just a few odd huts here and there amongst coconut palms close to the shore which was also fringed with casuarina trees. From the foreshore mountains rose steeply thickly covered in vegetation and only very occasionally was an outcrop of rock visible on this side.

The large boulders along the shore made a pleasing contrast between the great mass of greenery and the shining beach strewn with shells and bits of broken and decaying coral. From this beach I was able to see the smoke of the little coasting steamer which visited Mersing on the mainland twice a week.

We retired that night at about 8.0 p.m. sleeping in the boats as there was no shelter ashore. Towards morning we were disturbed by a heavy swell which rolled us about and made further sleep out of the question.

At this spot, not one mosquito or sand-fly had been felt either in the boats or on the beach, a pleasant change from our short stay at Pulau Sribuat.

At 6.0 a.m. we landed from the prau, which we were able as the tide was high, to take into a small river which cut through a coconut plantation to a place where the stream was small: here we found very clear water in which we bathed.

That day was spent searching for shells and butterflies and having frequent bathes in the sea.

At 7.30 p.m. we returned to the boats and weighed anchor at daylight. The northern shores of the island were devoid of beaches, the rocks seeming to rise up out of deep water where they were met by dense masses of vegetation rising up to the tops of the hills.

Shortly afterwards our first mishap occurred. The chain slipped off the gear of the engine from over-oiling, disarranging the magneto, and the motor stopped. I was not too happy as we were in a bad position, a slight swell coming in from the North and to Leeward a rocky cliff with no anchorage near.

In three quarters of an hour however, during which time we rolled and drifted, the engine was restarted and at 11 a.m. we reached Juara Bay a lovely spot overshadowed by Bukit Kajang. Here we all landed.

There were big rocks lying in fresh water close to the beach and immediately above the usual mass of vegetation.

Butterflies were constantly passing to and fro over this spot and settling on the rocks or on little spits of sand close by. The footing was difficult but added a certain amount of excitement in obtaining specimens. We collected several shells here too, mostly forms of cowrie, and I was in and out of the water a good deal.

We noticed several places where turtles had buried their eggs, which had been dug up by the islanders. I was told by the local Malays that these eggs are buried very deeply, often as much as six feet and that the turtles then disturb the sand around for about a quarter of an acre to conceal the exact laying-place.

There was a small hut near here which was used as a Government Rest house, though very few officials ever visit Pulau Tioman.

I made enquiries about ascending Bukit Kajang but was told that it would take one day to go up and another day to return and as I could hardly walk owing to my legs being inflamed from sunburn I had to abandon the idea. This was a great disappointment as this peak at which I had so frequently gazed from the mainland was one of the chief inducements which had launched me forth on this trip. Bukit Kajang looked beautiful in fine weather, unusually crowned with white cumulus clouds, and I have always longed to reach the top feeling that the views from there must be full of interest.

It rained slightly during the night and we all got rather wet as the wooden awning of the launch was not very rain proof. Tea was made that morning by the party ashore and brought off to me. Unfortunately the water they used was salt so it was undrinkable.

The water was taken from a stream which on the previous day had tasted as fresh as one could wish. I assume that this stream was flooded by the tide in the night and that it took several hours to clear itself again.

We weighed anchor at 7.50 a.m. and moved off from a spot which was one of the most beautiful I have ever seen. At that time of the morning the sea was a blackish blue appearing to be very deep. I wished I had a sounding line to test the depth close

in to the rocky cliffs. The mountains above were constantly enveloped in clouds giving a gloomy and rather awe-inspiring effect to the whole scene.

We arrived off Mokhut at 9.30 a.m. where we anchored for a short time to collect coral. The water was very clear as usual and the depth suitable, about 3 fathoms I should think. Three or four of the crew started diving to collect specimens but my serang Awang proved to be by far the best for endurance and skill.

I was amazed at the length of time he was able to remain below although it was nothing to the feats of sponge divers in other seas. He would sit on the gunwale by my side while I pointed out some special piece which I was anxious to obtain. He slipped into the water, never really diving in our sense of the word, and was soon to be seen with his hands underneath the piece to be removed. I felt he would never rise and there appeared to be no movement of the coral but suddenly he would stand erect with the piece in both hands and come quickly to the surface alongside the boat. Here we relieved him of the trophy which in many cases we found very heavy and difficult to lift in without damage. I asked the divers how they were able to raise such heavy pieces from the bottom but they said that until they reached the top the weight was hardly noticeable. The living coral as we obtained it was most beautiful to look at but it was full of slime, and its smell to my mind was most unpleasant. It was so bad that I always had it passed to the prau where it was carefully stowed. In some cases we found minute shells and even small fish in the crevices. Some specimens were so heavy and the construction so brittle that the very weight of the piece resting on the bottom of the boat caused portions to be crushed or broken. We made a fine collection at this place which proved to be the best during the whole tour.

The islanders use mostly a very small "Koleh" or canoe, large enough to hold one person and propelled by a doubled-bladed paddle. In these small craft they dart about the bays and even a little way out to sea with their fishing lines. The canoes carry a small sail which helps them when the wind is astern but from personal experience I can say it needs a good deal of skill to keep the craft steady and afloat, there being very little free-board.

At 11.45 a.m. all the crew came aboard the boats. At the last moment an old Malay wearing spectacles came off to us in a Koleh and brought me two beautiful shells.

We started for Pulau Pemanggil at 12.30 p.m.. This had been a grey day. The smell from the coral was most unpleasant and I was thankful to have it astern of us although sorry for the occupants of the prau.

My impressions of Pulau Tioman are lovely hills and mountains rising abruptly from the sea and covered thickly with trees and other vegetation. Wherever the shore is accessible are small coconut plantations, nice sandy beaches, coral reefs and beautifully clear water. The people were friendly, but few and widely scattered. There seemed to be plenty of fresh water everywhere as there was in the other islands.

On our way to Pulau Pemanggil we met a strong southerly breeze which made the sea choppy and we shipped a good deal of water. This was the first really rough sea we had encountered. We tried to anchor on the west side of the island but the waves made this impossible so we finally anchored to the North where we were sheltered. To leeward of us were big rocks which would be dangerous in the event of the anchors dragging. The North and Eastern sides of most of the islands are characterised by huge rocky boulders and cliffs which alone could withstand the ravages of the N. E. Monsoon while to the Westward are found sandy beaches and a much more luxuriant growth of vegetation. The hills of Pulau Pemanggil are not so high as Tioman but here again they rise steeply from the sea. I noticed quantities of Pandanus growing above the rocks. The latter were mostly very large, blackish in colour and rounded by the constant pounding of the seas.

We lost the anchor of the prau amongst the rocks but my Malays quickly constructed a useful substitute, the usual Malay anchor which consists of 2 pieces of wood lashed together at an angle and weighed by a stone.

The rocks here were too steep and slippery to afford a good landing so dinner was cooked in the boats.

We turned in early that night—7.0 p.m.—but were up and about by 5.15 a.m. the next morning. We weighed anchor at 6.0 a.m. and went round to the west of the island again where we had intended to stay originally. The sea had calmed considerably. There were 4 Malay houses here built close to the beach from which the hills rise up sheer, large boulders being visible here and there amongst the greenery. Banana plants and coconut palms were scattered about, producing sufficient fruit for the owners. This was a pretty place known as Telok Buan.

The water here was as clear as usual and the corals equally beautiful. They did not seem to vary much from island to island except in abundance.

I stayed in the boats as I could not walk owing to acute sunburn while others went ashore to get fresh water, eggs and fruit and to collect shells and butterflies. I had taught my Malays what I wanted and the results were quite satisfactory. It seemed strange to find so much insect life at this distance of 30 miles from the mainland and most of the species if not all that I obtained I afterwards collected in Johore.

The sun came out and the wind freshened again so at 10.0 a.m. we moved off for a more sheltered part which we reached in half an hour. This was Telok Lanchang: there was a very small sandy beach and a steep hill rising above it. No houses: on either side of the beach were large rocks which seem characteristic of this island.

I sent my Malays ashore to look for Orchids, butterflies and shells of which last they collected some good examples.

My tea was brought off to me at 4.0 p.m. Our bread kept excellently in a covered kerosine tin.

We had a bad night. I could not sleep, for the motion of the boat hurt me as there was a fresh breeze and a good deal of swell. This lack of sleep turned out to be fortunate because in the middle of the night the motor boat began to drift and we were soon bumping the rocks.

I roused the crew and we discovered that our anchor chain had snapped leaving our precious steel anchor among the rocks at the bottom. There was a strong wind blowing us ashore and we could only get off by starting up the motor.

A new anchor was constructed and let go and all seemed well again. About an hour later I noticed the prau slowly moving past us and shouted to rouse her occupants. She had shared our fate and again we were all astir making her fast while still another anchor was constructed. After this we kept an anchor watch and had no further trouble.

Next morning an old man brought me some live Cowrie shells which he had collected at low tide. These were beautiful specimens and much smoother than any we had obtained before as they had not been exposed to the weather. The lack of variety in the shells we had collected so far was a disappointment to me. No doubt if I had been able to make a longer stay I should have fared better but I had noticed at Malay houses where several fine shells had been used as decorations to the approaches of their compounds that there was very little variety of species.

Next morning we were up early and started for Pulau Aur at 5.30 a.m. The weather was bad, a strong Southerly wind and big seas driving in against us. I got Awang our Serang to steer the motor boat on this occasion being the coolest boatman we had but we hadn't gone far before a big sea broke over us drenching everything. The seas were really rather dangerous and we were in constant fear of being swamped.

The fact that we could see the fins of two sharks following persistently in our wake was hardly encouraging. This weather continued until we reached the shelter of the island at 9.00 a.m. There are two islands here separated by a narrow strait and we had to pass to the Northward before turning into the Strait where we were sheltered. The Northern side was very steep and most

beautiful to look at, hundreds of sea-birds using it as a resting place. The cliffs ran sheer down to the sea and it was a relief to pass into the narrow lane of quiet water. Amongst the rocks coconut palms were growing profusely.

There was a strange quietness as we entered the strait, no boats on the water although we could see several people on either shore. One of our crew then told us he had heard that a festival to propitiate evil spirits was then in progress and that we might not be allowed to land. It was far too rough for us to stay outside so we dropped our anchor and waited patiently for something to happen.

We had not long to wait before a jalor came off to us bringing the local representative of the Government, Inche Hamid, who turned out to be a good friend to us. He knew several of our crew as he frequently visited Mersing. He explained that strictly speaking we should not be allowed to land, but as we came in here unknowingly and there was no other shelter to be had we might stay on condition that we observed all their customs and respected their beliefs during the festival.

We pulled up both boats on to the beach on the Southern island of the straits where several people came down to see us.

This was the biggest crowd we had seen since leaving Mersing and we could not get away from it. Inche Hamid on learning that I was collecting shells presented me with some very fine ones which I was glad to accept, particularly as we would not be allowed to collect shells or butterflies until the festival was over. We were told also that no fish or fowls were to be killed. This was rather serious as the food supply of the crew was practically reduced to rice. I frequently fell back on eggs which were usually good.

I was confined to the boat, the sunburn blisters being enormous although the swelling was less. We had an opportunity of drying our possessions which had been soaked coming from Pulau Pemanggil and made the most of it, the beach in our vicinity soon being covered with clothing, etc.

While I was lying in the stern I found many of the people most inquisitive, crowding round and solemnly gazing at me from close quarters as though I were some wild animal. This got so bad that I had to lower all the side curtains of the boat as a screen and at last had some peace. One could hardly blame them because life is a very simple affair here, and the sight of a white man rare; I tried staring them out but to my surprise I generally failed although a few did turn away bashfully.

My motor driver reported during the morning that the propeller shaft was cracked. This was bad news, as we were a distance of 44 miles from home and there was rather bad weather outside. I hoped for the best and as things turned out I was very lucky. Nothing could be done here anyway. There was

a Chinese who kept a shop here, the only one in the island. I believe he had been here many years dealing in Copra and other side lines. I bought some fine large shells from him and he told me that he buys them from the islanders by the pikul and ships them to Singapore.

I heard that evening that the following day would be the climax of the festival and therefore we should not be allowed to reside in the boats or go to sea, so they had provided room for us in a good Malay house belonging to the local Customs Officer. That day was most offensively warm and as the motor boat in which I was lying had been resting at an angle, in spite of props, I had been most uncomfortable.

The islanders had made a boat about 6 feet long out of Sago Palm with sails of fibrous matting. It had been decorated with flowers and coconut leaves which they called Puchok. This was to be set adrift that night laden with gifts taking the ghosts of the island away with it and then we should be able to resume normal life.

There had been a good deal of sickness on the island during the year and this ship of peace was expected to put things right.

My fellow voyagers on their own inspiration summoned a Malay doctor to cure my sunburn blisters. Just as I expected he turned out to be an old man, teeth stained black and red from constant chewing of betel-nut. He had a younger man with him who was I presumed his assistant!

A fairly large crowd of inquisitive Malays followed them to see the performance.

They climbed the side of the motor boat and sat facing me for a time, gazing thoughtfully and in silence much to my embarrassment, while the side of the boat were lined by a crowd of Malays young and old, which made the stifling atmosphere even more unendurable. By some tactful remarks I succeeded in having part of the audience removed.

The Pawang, then explained with regret that unfortunately the best medicine was not available, but asked for some fresh water over which he said a few words. I was asked to drink some of this which I did, and then he made my boy bathe the blisters with it. Some more water was brought and more words were said over it. After this his assistant in Magic repeated a phrase over my miserable legs and the ceremony was pronounced as finished.

Shortly after this I was carried to the Customs house, quite close by fortunately, which commanded a fine view of the strait, the copra drying platforms and our boats.

The house was beautifully clean and pleasant in every respect. We were welcomed by the Customs officer, Mohamat Tiar, a very amiable Malay, who was also school-master here. He was dressed in correct Malay costume which was so much nicer than

the semi-European garb so often adopted. We brought up all our possessions from the boats except the shells and coral and were soon very comfortable.

During the evening a Ronggeng was held at which I was a little surprised owing to the strictness in other directions of this ceremony which was about to be completed. I tried to sleep but was kept awake for some time by an enthusiastic Gambus player accompanied by Tambours.

The same night the ghost-ship was launched and with it all the troubles of the island. I was sorry not to see the ceremony. This festival takes place as a rule once in every 8 or 9 years so I was fortunate in being present although I was virtually a prisoner. The Customs officer told me that there were about 200 inhabitants resident in the island at the time of our visit. They must have all visited me in the motor boat!

The following day was very hot with a blazing blue sky and the wind had dropped considerably. That afternoon I found I was able to walk a little, the first time for many days. Wonderful people, Pawangs!

I was interested in the evening watching some Malays playing Sepak Raga (Malay Football) They wore a small piece of sago-husk tied to the side of the foot called "Lepak" and kicked a Rottan ball with this protection, trying to keep it constantly in the air. The players stood in a circle and the skill displayed was marvelous. I have read of this game being played in Burma and Siam so it appears to be common in the East Indies.

The nights here were very hot and sleep was difficult.

Early the next morning I was able to walk to a fresh water stream where I had a most refreshing bathe, the first for many days.

Some of my crew went that morning to a Kramat in the island which was rather too far away for me. The rest of us prepared for our departure by sorting out the shells and coral, cleaning the boats and collecting butterflies in the short time left us. We managed to find some more coral that morning while the tide was very low and part of the field was exposed. This coral was rather different from the pieces we collected at Tiunan.

There were curious outcrops of rock all over the parts of the island I had visited.

One of these stood straight up on end and was thickly surrounded by vegetation. These boulders are composed of Granite I believe and are similar to many I have seen since in other parts of the Peninsula, but at the time of my visit these were the first I had come across.

I caught a few butterflies here which I had not seen on the other islands though this does not necessarily mean that they were not to be found there. There were several small streams-

running down from the heights and broken up by boulders, clumps of palms of all kinds and undergrowth. These were the places where the butterflies were most plentiful, the water being a great attraction.

The small Malay boys here amused themselves by collecting coconut beetles to which they tied fine pieces of thread and then allowed them to fly about after the manner of a kite.

There were 4 cannon on Pulau Aur which I was unable to see as they were placed near the Kramat which was rather a difficult walk from where we were staying. The Penghulu said they had been taken from a wreck on the island about 200 years ago but he admitted that he did not know very much about it. He sold me an old Dutch silver coin which is dated 1792.

Very likely there is some connection between the coin and the cannon but if so this would bring the date of the wreck down to about 100 years ago.

Pulau Aur stands well out on the route to China from Singapore and any amount of history might have been enacted in the neighbourhood.

We found here two Chinese shopkeepers who acted as middlemen between the Malays and Singapore. They had then been resident here about six years. That afternoon I sent for the Pawang who had attended me and made him a present of Assam, salt and a little money. This was presented to him ceremoniously on a plate and before leaving he insisted on my drinking a little water which he had blessed as before.

We left Pulau Aur that evening at 5.30 p.m. after taking farewells of the Penghulu, Inche Hamid and the Customs officer.

All these people had been very kind and helpful during our stay and I think they appreciated our observance of the restrictions from which we had suffered.

Pulau Aur would well repay a longer stay to study the bird life, particularly the sea-birds who use it as a resting place.

On clearing the strait going Westwards we encountered an unpleasant cross swell from the South which caught us on the Port beam and we rolled badly. Many of the crew slept, but I found my time fully occupied in preventing myself rolling off the thwart on which I was lying.

We reached Pulau Tinggi, a distance of 27 miles at 10.30 p.m. but owing to the plugs being dirty and the motor running slowly we did not anchor until 11.15 p.m. Here we were in quiet water and able to rest at last.

We turned out at 5.30 a.m. to find ourselves lying off a sandy beach with a fringe of rocks sheltering it. This was Telok Sabira Besar. The tide was very low and a search was started amongst the rocks for coral and shells.

The inevitable hills rose up steeply from the beach, covered with vegetation consisting of coconut palms, banana trees, bēlukar and heavy jungle. We found no new shells. We met three of the islanders here, also a few Malays from Mersing who were fishing. They agreed to pilot us to the other side of the island. The tide rose very rapidly so we left at 9.30 a.m. and arrived at Pur Naga in half an hour.

I managed to put on shoes and stockings here for the first time for many days and went ashore. We were met by the old Penghulu who was very hospitable, entertaining us to coconut water on the verandah of his house. He assured me that had he known I was coming he would have prepared a curry to celebrate the occasion. I was sorry there was no means of letting him know! He said that Pulau Tinggi contained about a hundred regular residents.

It was a blazing hot day and the glare from the sea and sandy beach was most trying. We obtained nothing new in the way of shells or butterflies.

As usual we found the ubiquitous Chinese shopkeeper. There was only one shop here, close to the Penghulu's house, and it appeared to be the centre of the island life. This man kept some Hawks-bill turtles, swimming in a wooden tank. These were the first I had seen although later on at Mersing I kept two of these beautiful creatures in tanks of salt water for many months, feeding them on pieces of fresh fish. The markings on their plates were most handsome and the hawk-like beak very formidable.

The main feature of the island is its steep mountain Gunong Tinggi rising to a height of 2000 feet., This was covered with heavy jungle except at the top where a trigonometrical beacon had been erected the previous year.

It was too steep a climb for me just then so we prepared for our departure to Pulau Babi lying further North.

Pur Naga faces Pulau Sibul and the mainland and there are several smaller islands close by.

We left for Pulau Babi at 1.20 p.m. with a following sea on our Starboard quarter. The motion was unpleasant but the sea helped us forward considerably. We passed the Southernmost point of Pulau Babi at 3.40 p.m., called by my Malays Tanjong Rhu owing to the Casuarina trees growing in its neighbourhood but we didn't drop anchor until we had reached a position off the Customs House at 4.10 p.m. This was a poor anchorage as at low tide we were left high and dry with several rocks around us. We rigged up supports for the boats to keep them upright. On going ashore, the Customs Officer met us and immediately put his office at our disposal so we carried up all our provisions and bedding and made ourselves at home. It was rather a relief after many uncomfortable hours in the boats. I had my dinner that night at 8.0

p.m. and as there was a lot left over it was handed over to the crew who had already fed. A second meal didn't worry them at all! Their capacity for curry and rice amazed me. Any time and any quantity seemed to suit them.

It was a lovely night as we sat round a fire on the beach listening to the lap of the sea close by, while two Malays entertained us with the gambus and tambour. A further meal of beans was prepared and eaten by the Malays during this time. What a wonderful capacity for food!

There were very few mosquitoes here. This Bay also was known as Pur Naga.

As usual we turned out early, 5.30 a.m., and found a good bathing place close to the Custom's house. There was a stream of cold fresh water, running down some rocks, which was diverted over a drain made of bamboo and under which one could have a good shower bath.

We then proceeded over the rocks which were exposed by the low tide and a few good shells were found but the live coral was most fascinating. This was soft and slimy but otherwise had much the form of the hard coral. The rocks were small and the coral animals cling to these.

In some pools we found jelly-like bodies which on being disturbed emitted a dark purple liquid. There were many kinds of sea-weed also and I only wish I had the knowledge to describe accurately all what we saw. A kind of black sea-slug was common.

After breakfast I took a walk across the island to the Eastern shore. There is a steep range of hills running like a backbone the length of the island but we found a pass through coconut plantations, overrun with lallang and belukar as usual, where the hills were less steep, and suddenly came out above a beach littered with enormous boulders of rock and where the coral sand was a dazzling white in the morning sun. The scene was most beautiful and but for the presence of innumerable coconut palms reminded me of a Cornish Coast scene.

The bay was a small one and bounded by enormous rocks which appeared to have tumbled down from above. These rocks of course were the buttresses against the North East Monsoon which must beat in here with tremendous force.

It was fascinating to climb over them and look down into deep pools of crystal clear water where fish of many vivid colours were darting to and fro. I noticed here some fish with remarkable protective colouring, a kind of dirty white with grey markings so that when they were still it was practically impossible to detect them against the sandy bottom.



Coral field at low tide, Pulau Babi.

We returned to the house for tiffin. From here a grand view of the mainland was obtained across the sea, the mountains in the interior of Johore and Pahang standing up clearly.

A walk along the shore revealed the usual things, beautifully clean sand fringed by trees, casuarina trees and coconut palms predominating, and here and there a Malay house with the sea at the front door. There was a flat area immediately behind the trees, covered with plantations and grass to the foot of the hills which rise steeply, carrying a heavy covering of jungle. At intervals along the shore fresh water streams crossed the sands running down the hills and out to the sea.

This was my last evening before returning to Mersing.

The next morning was spent tying ropes to some heavy pieces of coral which we had broken off, but which would be easier to lift when the tide rose over the coral field. These were buoyed so that we should find them easily.

We found some rather fine quartzite crystals on some of the rocks.

We left Pulau Babi at 1.30 p.m. and after an uneventful journey over a calm green sea which looked very beautiful in the afternoon sunshine, while islands and mainland were all painted in delicate and varied shades of blue, we arrived back at Mersing.

During the whole trip our motor-boat, which we had to start with Benzine but ran on Kerosine oil, consumed 60 gallons of Kerosine and 4 gallons of Benzine.

My crew of Malays were splendid companions and did what was expected of them well.

The islands we visited were very similar in construction with perhaps the one exception of Pulau Aur where the rocky cliffs were steeper. Most of the hills had the usual whale-back appearance so common throughout Malaya and were mostly covered thickly in vegetation.

From what I saw, the insect and plant life varied very little although certain shells and corals seemed to be confined to special localities. I should imagine that Pulau Tioman would provide the best field for the Botanist. There were stories of large snakes frequently encountered on Pulau Babi but I did not see a single specimen.

The total mileage covered from our start from Mersing until our return was approximately 188 miles and our greatest distance at any time from the mainland was about 37 miles.

The export of Copra and dried fish from the islands is considerable and forms the main livelihood of the people, although minor products such as fruits, certain shells, (such as Siput Gwang and Siput Lolak) and special woods, rattans and damar may be considered.

Kayu Kemuning, used more particularly for Kris sheaths and handles, was to be found on Pulau Babi and Pulau Tinggi. Kayu Penaga was also fairly plentiful.

Edible birds' nests are collected and exported from Pulau Aur, Pulau Tinggi and Pulau Babi.

Among the fruits exported were Durians, Nangka, Chempedak, Rambutan, Sukun and many varieties of Bananas.

Description of a Native Oil Press (Chandasan) from North Borneo.

by H. G. KEITH, B. Sc.

Assistant Conservator of Forests, B.N.B.

(Plate XXV)

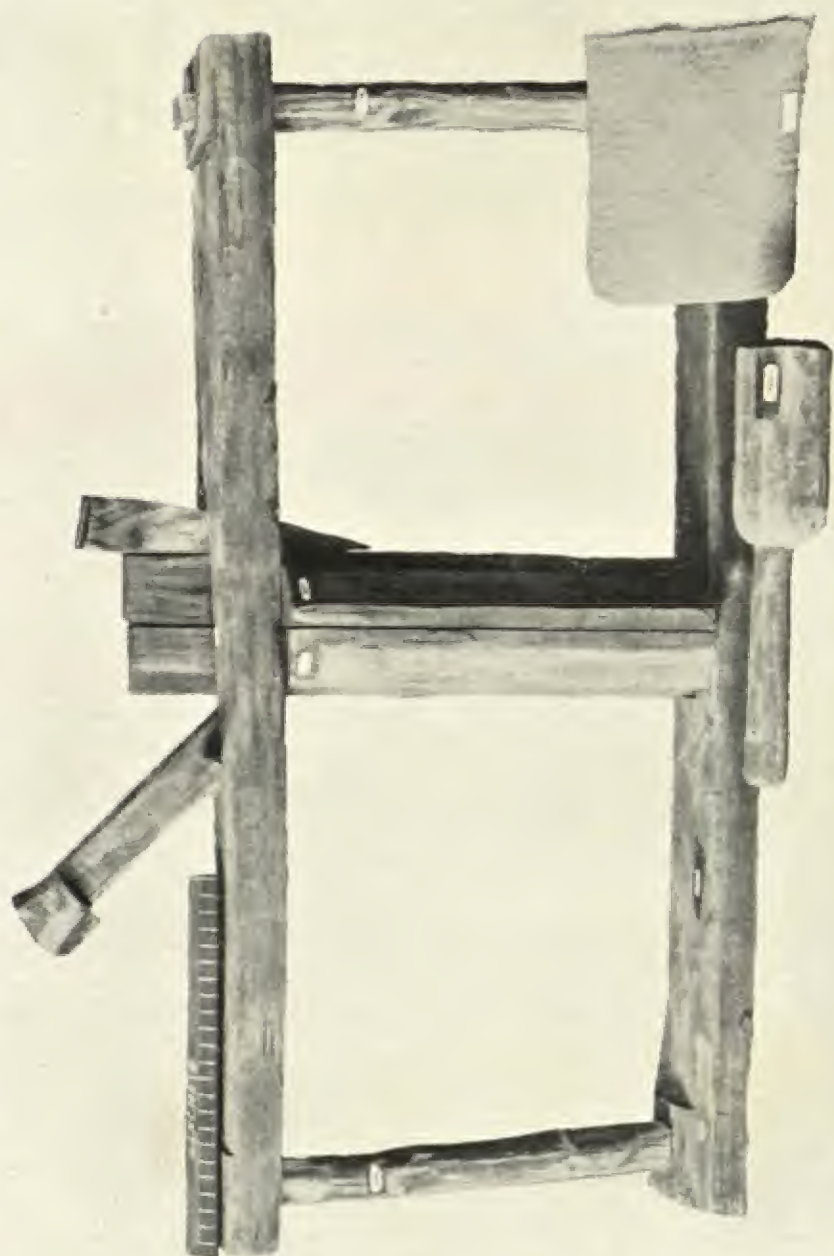
The oil press, or Chandasan, as it is termed by the Kadayan of Sipitang district and the Bisaya of Mempakul and Beaufort district is used for expressing oil from Katiau, Ilipe, and Kawang or Tengawang nuts. The nuts are produced by *Shorea mecistopteryx* (Kawang bukit), *Shorea gysbertsiana* (Kawang paya), *Madhuca* sp. (Black Ilipe), *Payena* sp. (Katiau), and probably others.

The Chandasan consists of two hand-hewn timbers, the base and the top (papan), supported by two peeled round timbers (tiang) set into slots cut into the base and top. In a slot cut into the middle of the base timber and projecting through a slot cut into the middle of the top timber are two half round hand-hewn and smoothed pieces of timber (gapit), placed so that the flat sides face each other. A wedge (baji turun) enters the slot through which the ends of the half round pieces project, on one side, and another wedge with a head (baji naik) protrudes on the opposite side. In order to force the two half-round timbers (gapit) together to obtain pressure the wedge (baji turun) is driven downward with blows from a round headed mallet (pangkur) and the other wedge (baji naik) is driven upwards by upward blows from the mallet (pangkur). When release of pressure is required the wedge (baji naik) is driven downwards; this frees the other wedge (baji turun) so that it may be pulled upwards and removed by hand, thus enabling the operator to spread apart the two half round timbers (gapit) and extract the woven rotan or bamboo bag (kandol) containing the oil cake.

Native process of oil extraction.

The nuts, after gathering, are thoroughly air-dried. After drying they are pounded in a mortar (lesong) until the outer covering or seed coat is broken. The broken coverings are then removed by sieving or by winnowing in a woven bamboo tray

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Native Oil Press (Chandusan) from North Borneo.



(niru). The cotyledons are then replaced in the mortar (lesong) and thoroughly pounded. The smashed cotyledons are then placed in a container (kerosine tin) without a bottom, but with two to three bars at the centre on which a woven bamboo screen (sadak) is placed, to hold the smashed cotyledons, before cooking.

Three to four upright sticks are inserted through the packed smashed cotyledons to ensure a uniform distribution of heat and steam, which rises from below.

The bottomless container is then placed in a large tin or earthenware bowl which is filled with water. The container and bowl are then covered with an empty rice bag or a cloth, in order to retain the heat. The bowl is then placed over a fire and the water brought to boiling point: boiling water must not reach the wooden bars in the bottomless container, on which rests the mat (sadak) and the crushed cotyledons. The cooking lasts approximately one hour. The cooked cotyledons are then placed in a woven rotan or bamboo bag (kandol) and inserted between the half round timbers (gapit) in the press.

Pressure is obtained as explained above. After pressing, the bag (kandol) containing the cake is removed, the contents dried, recooked and again pressed. The oil from the pressed cotyledons runs down a trough (chachurong) made of betel-nut palm leaf-sheath (upeh pinang) into a bamboo tube or metal bowl.

In the case of Kawang or Tengkawang oil the process differs slightly from the process employed in the bottling of Katiau or Ilipe nut oil. Kawang or Tengkawang oil on cooling hardens into a tallow like substance, and for that reason it is run off into bamboo tubes. Katiau oil, on the other hand, does not solidify, and is therefore run off into bottles.

Katiau and Kawang oil are both used by the natives for cooking purposes etc.

Kawang or Tengkawang nuts are of considerable commercial value and are used in the manufacture of chocolates and confections. In good seed years large quantities of these nuts are exported to England from North Borneo.



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Gold Ornaments Dug Up At Fort Canning, Singapore.

By R. O. WINSTEDT, C.M.G., D.Litt., Oxon.

(with plates, XXVI—XXVII and one sketch map).

"The Hill was originally a cone-shaped eminence but when Fort Canning was built the summit was taken off and with the excavated earth a plateau of approximately 10 acres was formed, surrounded by ramparts and a moat. This plateau is now being excavated over an area of 7 acres to a depth of 10 feet for the building of Singapore's new Service Reservoir. The bottom of this excavation is all solid original ground, but in many places the line between it and the filling placed above it about a century ago, can still be followed.

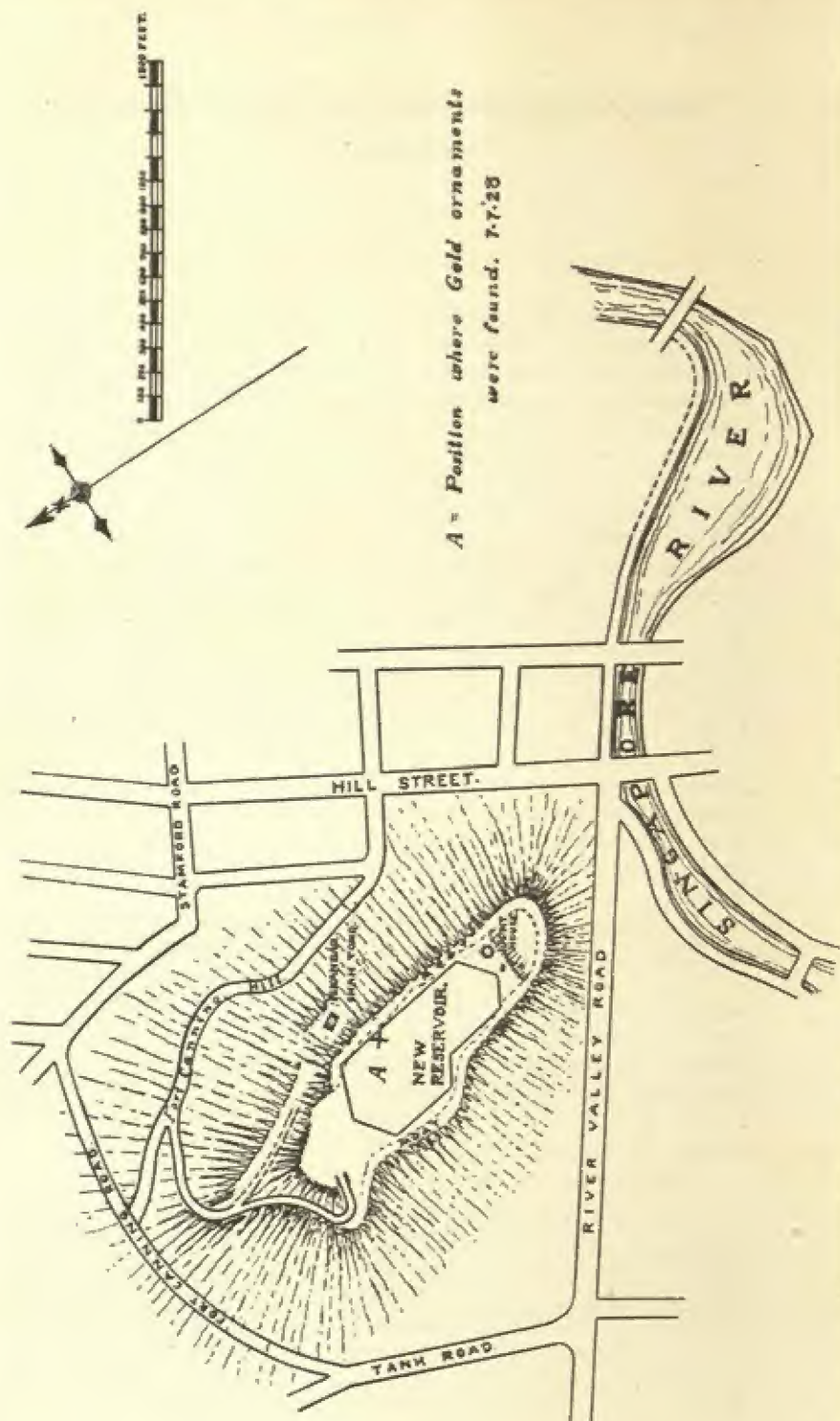
"At 1 o'clock on the 7th July the final trimming up of the 10 foot wall of the excavation was in progress on the East side of the Plateau, directly above the existing "Tomb of Iskandar Shah" which is 120 yards further down the hillside. The Chinese men and women coolies were working from the level of the excavation, hacking at the earth on the level with their heads and drawing it down with *changkols* into baskets at their feet. It was while they were digging at the outflung roots of a tree that the gold ornaments were exposed, being dragged down by a blow of the *changkol*. All in one spot, not wrapped up in any way, they seemed to be lying about 5—6 feet below the existing ground level of the plateau but only just beneath the line of the original solid ground level."

So writes Mr. Butler, the engineer who took charge of the ornaments and has drawn the plan, which accompanies this article.

There were no signs of a grave or of bones and it is significant perhaps that both the armlets were unclasped. It may be surmised that the jewellery was lost, or buried for safety during a siege or flight or for the purpose of theft or by some one who wanted to hide loot. They may have lain nearer the surface centuries ago; even in Raffles' time Malays refused to ascend this 'accursed' hill, so that the spot was not likely to be closely searched.

The ornaments consist of

(a) A pair of large flexible gold armlets almost exactly alike, weighing 50 *mayams* each. The girth is 195 mm. = $7\frac{5}{8}$ inches = inside measurement, too large for a wrist. Dr. P. V. van Stein Callenfels tells me that he has never seen flexible bracelets from the Hindu period, nor are ancient or modern anklets flexible. One of the armlets is perfect and the tongue of the clasp slides into its socket with ease, being secured by a split pin. The other has the flat back of the fastening slightly crushed, and two of its gold



strands broken—the latter apparently before the time of concealment, as one of the strands shows clear signs of a roughly looped join done by an amateur and not by a smith and another of fusing. The tongue is of a type common to-day. In each armlet it slips into a socket concealed by a plaque of *repoussé* work (26 x 27 mm.). On each plaque is beaten and chiselled an old Javanese Kala head, originally a lion's head but highly conventionalized:—the lower jaw is missing, the tongue extruded, horns spring from the cheeks and from the outer corners of the eyes. Dr. P. V. van Stein Callenfels, Inspector of Antiquities, Netherlands India, points out that at one period the brass and coppersmiths and the goldsmiths of East Java used it as an ornament (cf. *Oudheidkundig Verslag* 1925 I and II, pp. 20, 21 and pl. 8 and 9) and from their style he is inclined to ascribe these armlets to the Majapahit period at its best, *i.e.*, the middle of the 14th century A.D.

(b) A ring of pale gold but of the same quality, its lighter colour being due to the fact that it has not been polished. It weighs 4 *mayam* 11 *saga*. It is of old Javanese shape. Its socket is flat on the top but shaped to the finger below. It is broad enough to admit a man's finger but will not pass over the knuckle even of a woman's little finger. On the bezel is incised very clearly the figure of a goose flapping its wings. The golden representation (*Banyak Dalang*) of a goose is still one of the regalia at Surakarta. A goose, according to Dr. Callenfels, is a well-known ornament in old Javanese architecture and a flock of flying geese is carved near the cornice of temples in old Central-Javanese and the oldest Eastern-Javanese architecture. He suggests that the figure on the bezel may have been connected with the name of the owner, as names combined with the word *Banyak* (= goose) were common in the Javanese Middle Ages, *e.g.* *Banyak Wide*, etc.

(c) Six rings set each with 11 inferior diamonds of the Pontianak type (7 on one section and 4 on the other) and each having a flimsy bar-and-socket joint and a rude wire hinge. Sinhalese and Indian jewellers suggest they are three pairs of ear-rings. The gold is 24 carat and presumably there was no need to stint the amount used. The rings are too fragile, too clumsy in contour and far too narrow in diameter (outside 20 mm.; inside 10 mm.) to be finger or toe-rings. Possibly they may have hung from a cord of some kind that passed through the ear. Dr. Callenfels identifies them as of Javanese shape.

(d) One larger elliptical (13 x 10 mm. inside) ornament, set with an inferior pale ruby, known to the trade as cabochon (*i.e.* polished but uncut), and having a setting with two claws for another missing stone of the same size. It is also set with 8 small diamonds. From its shape this article cannot have been a ring.

(e) One jewelled joint or clasp (weight 5 *mayam* 5 *saga*). A Sinhalese jeweller suggests it was a nose-stud but certainly the elaborate internal joints and perhaps the weight are against this.

That it was the clasp of a *tali* or other neck-cord made of perishable material seems perhaps improbable as it would chafe the skin. Moreover it looks self-contained and perfect. It is set with 15 tiny diamonds and one pale cabochon ruby and has a socket for another ruby.

Indian jewellers in Singapore pronounced all the articles to be ancient Hindu jewellery, all made of the best (24 carat) gold, of very good workmanship and even now hard to copy. None of the stones are of value. The total intrinsic value of the gold is about \$450.

We know that with the introduction of Islam in the 15th century A.D. all such jewellery went out of use and was generally melted down. We know, too, that Javanese from Majapahit, as part of their campaign against the great old Empire Buddhist Palembang, captured Singapore about 1360 A.D. and raided ports of the Malay Peninsula. It seems quite certain that these ornaments belong to that era. They are therefore the most interesting archaeological remains in British Malaya, if we exclude a few stone monuments, like the inscribed stones of Kedah and Province Wellesley, Trengganu and Pengkalan Kempas.

[Dr. van Stein Callenfels now informs me that some very rough flexible bracelets were discovered a short time ago in the residency of Purwakarta (Western Java), proving that this make of bracelets was known in Hindu-Javanese times. R. O. W.]



R. O. WINSTEDT: Gold Ornaments from Fort Canning.



The Geology and Mining Industries of Johore.

By E. S. WILLBOURN,

Senior Geologist, Federated Malay States.

(With a Geological Sketch Map, plates XXVIII—XXXV
and 2 text figures).

Introduction.

This report includes the results of field-work by Messrs. G. R. Fulton, H. E. Savage and E. S. Willbourn.

Except for some notes collected by Mr. J. B. Scrivenor and Dr. W. R. Jones, Mr. G. R. Fulton was the first Officer of the Geological Survey Department to work in Johore, and, for over two years, from January, 1922, till he left the Government Geological Survey early in 1924, he conducted a very energetic exploration of the most inaccessible parts of the State. His energy and keenness provided a great part of the information used in compiling this account and it is very much to be regretted that illness prevented him from completing the work.

As it was, a considerable amount of field-work remained to be done. That in the Muar District and the Segamat District was done by Mr. H. E. Savage during the first three months of 1926. The remaining field-work was done by Mr. E. S. Willbourn during 1925, 1926 and 1927, and the task of linking together the results of the three workers was left to him.

A coloured Geological Map, Scale 3 miles to 1 inch, has been prepared, based on the 1926 Revenue Survey Map of Johore. On the small-scale black and white sketch-map, that is here published, it has been impossible to print all place-names, so it would be advisable for any one who wishes to follow the report in detail to consult the 3 miles to an inch Revenue Survey Map.

Literature.

J. B. Scrivenor.—"The rocks of Pulau Ubin and Pulau Nanas." Quarterly Journal Geological Society, Vol. LXVI, pp. 420—434, 1911.

"Notes on a collection of rock-specimens from Pulau Pisang, West Coast of Johore."

Jour. F.M.S. Museums, Vol. VII, pp. 31—34. 1916.

G. R. Fulton.—A summary of an economic report on minerals in Johore is given in the Geologist's Annual Report for 1922, paragraphs 37 to 54, and the substance of it is included in the present paper.

1928] *Royal Asiatic Society.*

The Geologist's Annual Report for 1923 contains short extracts from Mr. Fulton's work amongst the islands in the China Sea, and in the country between Kuala Endau and Bekok Railway Station. Mr. Fulton thought that the volcanic rocks in this latter district were younger than the granite. However, a resurvey of part of this district by the writer, and a trip to Gunong Besar up Sungai Endau in 1925, showed that the volcanic rocks are really older than the granite, and an examination of Pulau Tioman proved that the volcanic rocks there are certainly of pre-granite age.

E. S. Willbourn.—The evidence of the age of the volcanic rocks in North Johore was given in the Geologist's Annual Report for 1925, and the rocks in the Mersing District were described. The prospects of mining in the Endau Valley were stated to be poor. Mines in South Johore were mentioned.

In the Geologist's Annual Report for 1926, an account was published of the geology of the islands in the China Sea including the above-mentioned evidence on Pulau Tioman that the volcanic rocks are older than the granite.

Physical Features and General Geology.

Position, Area, and Boundaries.—Johore is one of the Unfederated States of Malaya, occupying the southern part of the Malay Peninsula. Its area is about 7,500 square miles. The island of Singapore lies at the south end of the Peninsula, separated from the mainland by the Johore Straits, a strip of water with a width of about half a mile at Johore Bahru. The northern boundary of the State touches Malacca and two of the Federated States, Negri Sembilan and Pahang. The China Sea is the eastern boundary, and the Straits of Malacca lie on the west side.

General Topography.—The greater part of Johore is flat or undulating ground, from which, here and there, rise isolated groups of mountains. This topography is very different from that of the major portion of the Peninsula lying to the north of Johore, which is built up of roughly-parallel ranges of mountains, most being granite, separated by areas of gently-undulating or hilly land, formed of ancient and recent sedimentary rocks. These ranges, in general, are parallel with the long axis of the Peninsula. They all die out as they are traced southwards, and the longest of them, the Main Range, ends in Malacca territory.

This linear arrangement of the mountains is conspicuously absent from Johore, where mountains rise from the plains in an apparently haphazard manner.

Structure of the Peninsula—The structure of the Peninsula was determined by intense folding-movements which occurred in the Mesozoic Era. Granite welled up from below to occupy curved anticlinal-axes, whose curvature is indicated by changes in strike-direction of the ancient sedimentary rocks, going from north to south. In Siam, Kedah, and Kelantan, it is a little east of north

by west of south; in Perak and Pahang, it is north and south; in Selangor, Negri Sembilan, and South Pahang, it is approximately N.N.W. by S.S.E.; while in Johore, it is about N.W. by S.E. Very intense erosion removed a great thickness of sedimentary rocks, and in some places, it has exposed the more resistant granite-cores, with the result that, in the Peninsula north of Johore, granite outcrops were left as ranges of mountains.

Structure of Johore.—It would appear that in Johore the granite was not intruded to occupy the entire lengths of the anticlinal axes, so that the tops of the different intrusions had a very irregular peaked form, and the effect of erosion was to leave these intrusions as groups of granite mountains which have not the linear arrangement so characteristic of the greater part of the Peninsula. However, the general strike of the pre-granite sedimentary rocks varies from N.N.W. by S.S.E. to N.W. by S.E., which is a continuation of the strike of the rocks further north, so, in spite of the absence of long mountain ranges, it is clear that the structure of Johore is part-and-parcel of that of the Peninsula.

Mr. G. R. Fulton in 1923 recognised the prevalence of the N.W. by S.E. strike in the sedimentary rocks of the east coast.

A detailed description of the topography of the State will now be given.

Ulu Endau.—The largest mountain-group is one, built up mostly of granite, that extends over the boundary from south-east Pahang to occupy about 300 square miles of Johore territory in Ulu Endau. It includes the granite mountains, Gunong Besar (3403 ft., see plate XXVIII), Gunong Pukin (3178 ft.), and Gunong Bekok (3133 ft.), with Gunong Pertawai (2758 ft.), and Bukit Sengongong (2307 ft.), built of ancient volcanic rocks, besides a number of quartzite hills, the highest of which is Gunong Beremban (2752 ft.). This country is inhabited only by a few Jakuns, aborigines who lead a happy life on the rivers near the rapids which effectively hinder navigation for Malays and other civilised folk.

Sungei Endau.—Sungei Endau is a river about 80 miles long, rising on the east side of Gunong Besar. It flows east for twenty miles through mountainous country, over frequent rapids, (see plates XXIX, XXX, XXXI), and then pursues a meandering course (plate XXXII), across an alluvial plain, first east to meet the Sungei Sembrong near Tanah Abang, and then north to the sea, at Kuala Endau.

Sungei Sembrong and Sungei Selai.—Sungei Sembrong, a large tributary of the Endau, rises in the flat alluvial country near Kluang, and flows north or north-east to the Endau near Tanah Abang. Sungei Sembrong has several large tributaries, one of which is Sungei Selai, with a rocky bed in the mountains for a few miles, after leaving which it reaches the same broad alluvial plain and joins the Sembrong.

Sungei Kahang and Sungei Madek.—Another tributary of the Sembrong is Sungei Kahang, which rises in the alluvial plain near Kluang. The headwaters of Sungei Madek, a tributary of Sungei Kahang, are in the mountains, near Gunong Blumut,, but this river, too, quickly finds its way on to the alluvial plain.

Sungei Bekok and Sungei Segamat.—Sungei Bekok is another river rising in the Ulu Endau granite-mass. Like the others, it soon leaves the mountains and reaches the broad alluvial plain. It flows into the Sungei Simpang Kanan, a river that enters the Straits of Malacca at Batu Pahat on the west coast.

Sungei Segamat also rises in the Ulu Endau mountains. It flows west, crossing the railway at Segamat Station, and then enters the Sungei Muar.

Mount Ophir.—Mount Ophir (4187 ft.), known to Malays as Gunong Ledang, is a conspicuous group of granite hills arising from the plain near the corner-boundary of Johore, Malacca, and Negri Sembilan. Mr. H. E. Savage mapped the limits of this granite-mass, and he has indicated as Raub Series rocks the plain in which the mountain stands.

North-West Corner of Johore.—Mr. H. E. Savage has also mapped the north-west part of Johore, and has described it as built of quartzite and shale with interbedded ancient volcanic rocks and several small intrusions of syenite and granite. Bukit Perloh (886 ft.), on the Pahang boundary, is quartzite; Bukit Perloh Betarah (629 ft.), Bukit Selanchar (472 ft.), and Bukit Simpalo (822 ft.) are volcanic.

Between Mount Ophir and Ulu Endau.—As already mentioned, there is a plain surrounding Mount Ophir, and east of it lies quartzite-and-shale country, from which protrude intrusions of granite and masses of volcanic rocks.

Muar.—Near Muar are a number of granite hills, including Bukit Muar and Bukit Pengkalen, some of which are isolated 'islands' set in a plain of alluvium, while others rise from country built of quartzite and shale.

Bukit Trih is a curiously-rounded hill of sandy shale, rising precipitously out of the plain of coastal clay.

Bukit Panggang Lotong is a granite hill near the 20th mile from Yong Peng on the road which is being constructed to Muar. Contact-rocks rich in garnet are common on its eastern side, and the garnet was mistaken by a miner for tin-ore in 1927.

Bukit Ma' Okil (1904 ft.) is the highest peak of a range of hills extending north-east from Bukit Panggang Lotong, and forming the boundary between the Muar and Batu Pahat Districts. The lower slopes of Ma' Okil show outcrops of ancient volcanic rocks, so it has been assumed that the whole hill is volcanic. Two attempts were made by Malay Collectors to reach the summit, one from the

north side and one from the south, but on each occasion a tiger barred the way, and, as their only weapon was a geological hammer, the Collectors had to leave the ascent for some future occasion.

Bukit Inas.—Bukit Inas (1134 ft.), is a hill on the right bank of Sungei Simpang Kiri, built of alternating beds of conglomerate and quartzite, like the other hills to the east and south-east of it. It is sometimes known as Bukit Chapal.

Sri Medan.—(On a Johore Government plan dated 1921 this hill is called Bukit Menia.) Sri Medan (313 ft.) is on the left bank of Sungei Simpang Kiri. It is made of clay, with composition corresponding to kaolin, associated with haematite of exceptional purity. An iron-mine here (plate XXXIV) produces 30,000 tons of ore per month, assaying 64 per cent of iron.

Batu Pahat.—A conspicuous granite mass with two prominent hills, Gunong Banang and Gunong Penggaram, is situated near the town of Batu Pahat, at the mouth of Sungei Batu Pahat, the stream which results from the confluence of Sungei Simpang Kiri and Sungei Simpang Kanan.

Gunong Blumut.—Gunong Blumut (3321 ft.) is the highest part of a granite-outcrop in the centre of Johore, north and west of which is flat alluvium. On its east side is undulating country of sandstone and shale, extending to the China Sea; in the South are ranged several east-and-west granite ridges, each succeeding one to the south being lower than that in the north, until the Sungei Johore is reached, where a plain begins which occupies a large part of southern Johore.

Sungei Johore.—The Sungei Johore rises near Rengam in low country, and flows east over the northern part of the South Johore alluvial plain to the head of a long inlet of the sea near Kota Tinggi. At only one or two places in its channel is there any rock-exposure, and the granite of Bukit Lawang, a hill a few hundred feet high, three miles south of the river and twenty miles N.N.W. of Johore Bahru, is one of the few cases of an 'island' of ancient rocks occurring in the plain.

South-East of Gunong Blumut.—South-east of Gunong Blumut there is high ground, with some mountains of quartzite and sandy shale, such as Gunong Sumalayang (2020 ft.), Tajam (1512 ft.), and Panti, while others, Muntahak (2082 ft.), and Tunjoh Laut (1241 ft.), are granite.

Between Blumut and Batu Pahat.—Gunong Lambak (1675 ft.) lies at the edge of a ten-mile plain occupying the country on the west side of Blumut, and Mr. Fulton reports that it is built of metamorphosed sandstone and shale, the latter baked to a hard bluish-grey rock. Granite-veins are common in it, indicating that granite probably constitutes the core of the hill. Volcanic rocks

occur in the neighbourhood. West of Kluang is a belt of quartzite-and-shale country which is exposed in road-cuttings, and at Bukit Jintan (835 ft.).

North of Gunong Blumut.—Two or three miles north of Gunong Blumut is a mountain, Gunong Berhidong, only a few feet lower than Blumut itself, built up, according to Mr. Fulton, of volcanic rocks, and further north is the broad alluvial plain with an 'island' of quartzite, shale, volcanic rock, and granite, along which passes the road from Kluang to Mersing.

The alluvial plain extends in a north-easterly direction almost to the coast near Mersing, where it is limited by a low range of volcanic hills stretching from Tanjong Penyabong to Tanjong Selantar.

East Coast.—For a distance of seventy miles, from Bukit Lalang near Mersing, to Tanjong Punggai near the southernmost point of the coast of Johore, there are outcrops of weathered quartzite, conglomerate, quartz-schist, and carbonaceous shale, which have been examined and described by Mr. Fulton.

Islands in China Sea.—It seems that none of the islands in the China Sea belonging to Johore contain any ancient sedimentaries, other than those ejected from volcanoes, but that all are built up of volcanic rocks, or of granite or syenite. The linear arrangement of the islands in the different groups along north-west by south-east lines is significant of the continuation of the structure-lines of the Malay Peninsula.

South-East Corner of Johore.—An outcrop of volcanic lava and tuff forms Gunong Belungkor (588 ft.), a conspicuous hill in the south-east of Johore, and Bukit Pengerang too is probably of volcanic origin. Its slopes are covered with boulders of a rather puzzling rock with composition corresponding to kaolin.

Bukit Pelali (628 ft.) is built of aplite in contact with quartzite and hard-baked shale, interbedded with volcanic rocks, and granite occurs close to it.

Gunong Pulai.—Gunong Pulai (2141 ft.) is a granite mountain about 20 miles north-west of Johore Bahru. Mr. Fulton reports that the west side of the mountain shows a contact of granite with rhyolite and tuff. The outcrop of volcanic rocks is about one mile wide, and it is flanked on the west by a belt of quartzite and shale, which runs N.N.W. to join on to the quartzite-and-shale country around Kluang. All the way to Gunong Lambak it skirts a northerly extension of the Pulai granite.

East and South of Gunong Pulai.—There are occurrences of gabbro and quartz-diorite on Linden Estate, on the east side of Gunong Pulai. South of the hilly land is flat land extending to the Johore Straits, but it is interrupted in places by the occurrence of hills of red sandy shale, granite, and volcanic rocks.

Alluvial Plain of South Johore.—This is part of the broad expanse of flat or undulating country occupying some 400 square miles of country in South Johore. It is bounded on the north by the east-and-west granite and quartzite ridges which extend from the source of Sungei Johore to Muntahak and Panti, on the west by the Gunong Pulai granite, on the east by the quartz-schists and carbonaceous shales of the east coast, and on the south by the Johore Straits. The plain is covered with flat-bedded clays, sands, and pebbles, that were formed in recent times, described later in this account under the heading of high-level alluvium. The deposits form hills which are not known to exceed 300 feet in height; hills of 400 feet and higher, which occur here and there, are 'islands' of older rocks.

The Central Plain.—High-level alluvium also covers much of the inland part of the plain which crosses the Peninsula from Batu Pahat to Mersing, and which, as already described, is traversed by Sungei Sembrong, Sungei Selai, Sungei Kahang, Sungei Madek, and Sungei Bekok.

Coastal Alluvium.—Coastal alluvium in Johore, as elsewhere in the Peninsula, forms a large area of flat, swampy land, only a few feet above sea-level, constituting the plain which stretches from the south-west part of Johore through Kukub, up to, and beyond, Batu Pahat and Muar, and joining on to the alluvium of Malacca. On the east coast it is developed in the south-east corner, near Kuala Sedili, and near Mersing, but it does not form the continuous belt characteristic of the west coast.

History.

In Carboniferous times, while a very pure limestone was being deposited farther north in the Malay Peninsula, in Selangor, Perak, Perlis, Ulu Pahang, and Ulu Kelantan, a muddy deposit was laid down in Negri Sembilan and Johore, and volcanic lava and ash, ejected from submarine volcanoes, were being intercalated with it. This mud-formation, later altered to phyllite, is now exposed only in the country surrounding Mount Ophir. It belongs to the Raub Series.

In the Trias period the mud was covered by thousands of feet of sand, pebbles, and mud; and in this formation too were intercalated volcanic lava and ash. These Triassic rocks occupy about one-third of the area of Johore. In the normal course of consolidation the mud of both formations became shale, and the sand became sandstone.

Later, in the Mesozoic Era, great folding-movements contorted the sediments, metamorphosing shale to phyllite, and sandstone to quartzite, and generally imposing upon them a strike with direction varying from N.N.W. by S.S.E. to N.W. by S.E. Granite welled up from below to occupy the anticlinal-axes. The

TABLE SHOWING THE RELATIVE AGES OF THE
ROCKS OF JOHORE.

SEDIMENTARY ROCKS.	AGE.	IGNEOUS ROCKS.
Coastal alluvium and river-deposits	Recent.
High-level alluvium.	Recent.
	Mesozoic, Post-Trias and Pre-Tertiary.	Granite. In this group are quartz-veins, granite, hornblende-granite, and syenite. Diorite and gabbro occur, and, in the absence of evidence to the contrary, are included here. Some dolerite which occurs at Tanah Abang, intrusive into granite, is strongly sheared, so it is placed here.

Strong folding-movements preceded the intrusion of the granite, and metamorphosed the pre-granitic rocks.

Quartzite and shale, including conglomerate, chert, phyllite, and various schists.	Trias.	Pahang Volcanic Series. Most of these rocks are rhyolites and rhyolite-tuffs, but there are some andesites and basalts. Certain outcrops of quartz-porphry and dolerite are the hypabyssal equivalents of the extrusive rocks. The lavas and tuffs are intercalated, with the Raub Series rocks and with the Triassic quartzite and shale.
Raub Series rocks, which in Johore are phyllites. They form the plain round Mt. Ophir.	Permo-Carboniferous.	

phyllites and quartzites in contact with, and near to, the molten granite were heat-metamorphosed to schist. Parts of the granite-magma contained a very small percentage of tin, and, when most of the granite had solidified, this tin was left concentrated in a liquor or gas, contained under high pressure in cavities below. Shrinkage-cracks in the granite and schist provided an escape for the liquor, which shot into them and solidified as tin-bearing pegmatite, aplite, or quartz. However, much of this liquor contained no tin at all, and there are very many barren veins of these rocks.

After this there elapsed a long period, many millions of years, during which strong erosion occurred, removing thousands of feet of altered sediments, and laying bare the tops of the granite intrusions. On the whole, the granite proved more resistant than the other rocks, so granite bosses were left as high ground.

During the Tertiary period, sediments were deposited in Johore as they were in other parts of the Peninsula, but they were almost completely removed during the long period of erosion after the intrusion of the Mesozoic granite, and therefore are not included in the table. A possible occurrence is a small hill of gray shale with nodules, first seen by Mr. Scrivenor in 1909, at Nyor railway-station, and thought by him to be Tertiary, though no fossils have been found in them to give a clear indication of their age. They are, however, too much consolidated to be recent alluvium, and, on the other hand, quite unlike the sedimentary rocks older than the granite. The occurrence is too small to be marked on the map.

This brings us to recent times, a few hundred thousands of years ago, when the configuration of Johore was more or less as it is to-day.

The Raub Series Rocks.

Mr. Savage mapped the Raub Series Rocks, but, owing to the scarcity of exposures in the flat country round Mount Ophir where they occur, their separation from the quartzite and shale of the overlying series was a very difficult matter. As no fossils have been found in Johore, the only distinction is lithological. They consist of phyllites, and occasional calcareous shales, all devoid of sandy material, soft in the weathered zone, but below it, hard and impervious to water. The phyllites are the result of regional metamorphism on shales, and contain numerous, broken, lens-shaped quartz-veins.

North of Serdang in South Selangor, the Raub series is represented by a pure limestone, south of Serdang is this non-calcareous deposit of phyllites with occasional calcareous shales. Where they have been heat-metamorphosed by the granite the presence of amphibole often indicates that the original rock contained a certain amount of calcareous material, and a calc-schist exposed at Chabau, near the Malacca border, rich in garnet, pyroxene, and epidote, shows that here the original rock was an impure limestone.

Two other outcrops of calc-schist, near Bukit Panggang Lotong and Bukit Jintan, are detailed in the description of the quartzite-and-shale series, and, though it is very probable that these are Raub rocks, they are too small to be marked as such on the map.

Dr. W. R. Jones in 1913 saw specimens of dark limestone taken from pits that had been sunk some years before by Mr. Snow in the search for coal near Bukit Jintan. The writer has seen no limestone *in situ* in Johore.

The best exposures of Raub rocks are calcareous shales in railway-cuttings between Gemas and Batu Anam. Between Batu Anam and Segamat are outcrops of basaltic tuff and other Pahang Volcanic Series rocks, but none can be seen actually interbedded with the Raub rocks.

The Quartzite and Shale.

Lithology.—The commonest rocks belonging to this series are quartzite and hardened shale. As usually found they are weathered to sandstone and soft shale, but beneath the weathered zone, which usually varies in depth between 50 feet and 200 feet, the rocks are intensely hard, and impervious to water. They have been affected by regional metamorphism and, where this has been strongest, quartz-schists and phyllites are found. The shales are sometimes purple or green in colour. Local types of rock are conglomerate, carbonaceous shale, and carbonaceous schist, and some radiolarian chert is found near volcanic rocks.

Age.—No fossils have been found in the quartzite and shale of Johore, but the series is lithologically similar to fossiliferous rocks in Singapore and Pahang which are known to be of Triassic age.

East Coast of Johore.—Except for occasional areas of alluvium, the whole of the east coast of Johore, from Tanjong Punggai, near the south-east corner, to Bukit Lalang, near Mersing, is occupied by a long, narrow outcrop of rocks belonging to the quartzite-and-shale series. The following description is largely written from information given by Mr. Fulton in an unpublished account of the Geology of Johore.

Tanjong Punggai to Tanjong Lembu.—Quartz-schists containing white mica occur from near Tanjong Punggai, along more than twenty miles of coast, to Tanjong Gemoh, and in the south there are also boulders of limonite veined with quartz and haematite. The schists form long spits of rock at the headlands jutting into the sea in a south-easterly direction. A hard, cleaved, ferruginous, fine-grained sandstone outcrops at Tanjong Balau, Sungei Tengar, Tanjong Siang, and Tanjong Klesa. From Tanjong Balau to Tanjong Lembu, there is highly sheared grey quartzite and several small outcrops of carbonaceous shale, with a wide gap of alluvium between Kuala Sedili Kechil and Kuala Sedili Besar.

Tanjong Lembu to Tanjong Leman.—From Tanjong Lembu to Tanjong Leman the same rocks occur, but the carbonaceous shale is commoner than the quartzite. It was examined in long exposures on the sea-shore, some of which show that it is veined with quartz and contains secondary mica. At Laboh Tenggara (not marked on any map) and near Tanjong Petai, there are quartz-haematite veins and boulders of botryoidal haematite of good quality. At Kuala Paloi (a few miles north of Kuala Sedili Besar) there are silky, bright-coloured phyllites, weathered to a putty-like consistency owing to the solution of silica. At the eastern end of Tanjong Leman are vertically-dipping beds with strike N.W. by S.E., in the following order going from east to west:—

Conglomerate with pebbles of hard, red quartzite;

Fault-rock formed from quartzite and hornstone;

Hard, red quartzite;

Rhyolite, and bedded, fine-grained tuff;

Carbonaceous shale.

Tanjong Leman to Mersing.—North of Tanjong Leman there is no more carbonaceous shale, and red quartzite interbedded with red, hardened shale extends along the coast as far as two miles south of Tanjong Murau, after which conglomerate is often interbedded with them. The writer examined conglomerate at Tanjong Tenggara and saw it with red quartzite and shale at various spots between Tanjong Sekakap and Mersing (Plate XXXIII). The strike varies from N.W. by S.E. to N. 60° W. by S. 60° E. and the dip is usually very steep, though near the north side of Kuala Sekakap the dip is only about 20° . The pebbles and boulders in the conglomerate vary in size from an inch to two feet. They are nearly all quartzite, with some vein-quartz, and, less commonly, some of shale, and an interesting point is that many of the quartzite-pebbles were veined with quartz before being deposited in the conglomerate.

North of Mersing to Kuala Endau.—Bukit Lalang, near Mersing, is built of grey quartzite and phyllite, veined, with quartz, and north of this, for twelve miles, to beyond Tanjong Penyabong, the coast is volcanic. There is sheared grey quartzite at Tanjong Kempit, the headland near Kuala Endau.

Hills of Quartzite and Shale.—Some of the hills of rocks of the quartzite-and-shale series of Johore are Gunong Beremban and Bukit Peta (on the Pahang boundary), Bukit Trih (near Muar), Bukit Chapal (or Inas), and Bukit Kalong (near the Batu Pahat Iron-Mine), Gunong Lambak (near Kluang), Gunong Tumang (6 miles north of Muntahak), Gunong Sumalayang (near Gunong Tumang), Gunong Panti, Gunong Chelenting (in Ulu Sungei

Lenggiu), and Bukit Tangga Tujoh (thirteen miles east from Kota Tinggi). They are built of quartzite with sugary texture, interbedded with hard shale, and often with Pahang volcanic series rocks. Conglomerate occurs with quartzite in the hills near the Batu Pahat Iron-Mine. Hard red quartzite forms the long ridge of Gunong Panti, and is also seen at Gunong Chelenting.

South of Gunong Pulai.—Tanjong Kupang, and the other hills built of the quartzite-and-shale series rocks between there and Gunong Pulai, are built of sandy shale, which, in the usual weathered outcrops, is red or purple, and contains a considerable amount of secondary white mica. At Tanjong Kupang there is sandstone with calcareous cement.

The Pahang Volcanic Series.

Lithology.—The Pahang Volcanic Series includes an assemblage of lavas and tuffs of the Pacific type, varying from rhyolite to basalt, with hypabyssal rocks from quartz-porphyry to dolerite. Acid rocks, rhyolite, and quartz-porphyry, are much more widely distributed than andesite, basalt, and dolerite. In chemical composition, and in the nature of their constituent minerals, they all display a family resemblance to the ancient and present-day volcanic rocks of Japan, the Philippines, the Dutch East Indies, and of the other countries bordering the Pacific.

Resistance to Weathering.—Even in surface-outcrops which have been subjected to intense tropical weathering most of the rocks are very hard and compact, and all, except some rhyolite-lavas and coarse agglomerates, are very resistant to the weathering agencies of this country, which can convert granite into a soft clay, still preserving its structure, or quartzite into a soft sandstone. The weathered portion of an outcrop of tuff or lava or dyke-rock usually consists of a grey or whitish rind, only a fraction of an inch thick. The coarser tuffs and the rhyolite lava-flows, however, are more susceptible, as is seen in the case of the volcanic breccia and agglomerate of Bukit Arong on the north-east coast of Johore, which are weathered on the surface to a fairly loose boulder-deposit, and there are many exposures of rhyolite on the east-coast islands weathered to a non-crystalline, white, greenish, or pink rock, resembling in the field a very fine-grained sandstone or siltstone. All the rocks have been influenced by regional metamorphism, which has affected them to different degrees, depending on their original physical nature rather than on their chemical composition. The fine-grained volcanic ashes have been changed to intensely hard tuffs, highly resistant to weathering, because the volcanic dust which they contained has been converted into a hard, siliceous cementing-medium.

Age of the East Coast Volcanic Rocks.—For some years the volcanic rocks of the east coast and of the islands in the China Sea were thought to be probably Tertiary, younger than the Pahang

Volcanic Series, and when Mr. Savage discovered quartz-porphyry or rhyolite on Pulau Keban, with vertical hexagonal-jointing (see Plate XXXV), which, in cliff-exposures, left beautiful tall columns, this was taken to be added evidence of their post-granite age. It seemed evident that, if the rocks were old enough to have been subjected to the folding-movements which heralded the granite's intrusion, the vertical columns would have been tilted. However, in 1926, the writer saw volcanic rocks on Pulau Tioman, just outside Johore territory, which had been metamorphosed by the granite, and which were therefore certainly of pre-granite age. Also, rhyolite on islands near Pulau Keban is veined with quartz and therefore probably older than the granite, so it is most likely that all of the rocks should be classed with the Pahang Volcanic Series, and are all pre-granite. The columnar rhyolite is probably not a lava-flow, but part of the intrusive mass which acted as the reservoir from which the volcanoes were fed, a large plug, sufficiently rigid to be unaffected by the folding-movements.

North-West Johore.—Outcrops of volcanic rocks are found with the sedimentaries in the area limited by part of the Negri Sembilan and Pahang boundaries, the railway, and an imaginary line drawn from Segamat to Bukit Selanchar. Mr. Savage found them to constitute the country through which Sungei Palong flows, and to build up Bukit Simpalo, Bukit Batu Betarah, and Bukit Selanchar.

Ulu Endau and Ulu Selai.—Another, the biggest development of all, is in the Ulu Endau district, bounded on the west by the granite-mass which includes Gunong Besar and Gunong Bekok, and on the east by the quartzite country that extends south from the Bukit Peta ridge. Possibly the rhyolite, quartz-porphyry, and trachyte, building up Gunong Berhidong, three miles north of Gunong Blumut, was once part of this zone, and erosion, followed by the deposition of alluvium, have destroyed the continuity. In Ulu Endau, Gunong Pertawai (2,758 ft.), the summit of Bukit Sengongong (2,307 ft.), and the lower slopes of Bukit Taroeh (1,749 ft.) and of Gunong Beremban (2,752 ft.), are built of dark purple rhyolite and rhyolite-tuff, and there are many beautiful exposures of the same rocks in the rapids and waterfalls near the headwaters of Sungei Endau and Sungei Selai. Nowhere in this district were there found weathered rhyolite lava-flows of the type seen on the east coast, and in the absence of field-evidence showing undoubted lavas, it is assumed that the volcanic rocks of Ulu Endau and Ulu Selai consist mainly of tuffs and dyke-rocks. Examination of the dark purple quartz-porphyry under the microscope shows that the rock could be either a lava-flow or a hypabyssal rock. Metamorphosed basalt was found in Ulu Selai and also at the 10th mile from Kluang on the road to Mersing.

South of Gunong Pulau.—The small hill on which stands Towkay Ten Kin Sieow's house, in the rubber estate south of the area marked 1928] *Royal Asiatic Society*.

Cheng Lim on the 1926 Revenue Survey map of Johore, is an outcrop of volcanic rocks emerging from the high-level alluvium, and showing an andesite lava-flow interstratified with rhyolite-tuff containing lapilli of andesite and rhyolite. At Tanah Runtoh, and at various other points on the Johore Straits west of Johore Bahru, there are weathered cliff-exposures of rhyolite intercalated with sandstone and shale.

Gunong Pulai to Kluang.—Volcanic rocks occur in a narrow belt skirting the granite-mass that extends from Gunong Pulai to Rengam. Mr. G. R. Fulton examined the rocks exposed in Ulu Sungei Ayer Hitam, on the west side of Gunong Pulai, and found rhyolite and rhyolite-tuff metamorphosed by the granite. He found that the range of hills west of Gunong Pulai is mainly composed of volcanic rock. Rhyolite also occurs near the 35th mile from Johore Bahru, interbedded with grey-green phyllite, and purple tuff is seen a mile away. Rhyolite-tuff is interbedded with the shale and quartzite of this district, and outcrops in many places on Wessington Estate, on the Rengam road. An examination under the microscope showed fossil-radiolaria in shale near the 58th milestone, and it is significant that rhyolite-tuff is intercalated with it, thus giving evidence that the high silica-content in the sea-water necessary to form the siliceous skeletons was provided by submarine volcanic emanations.

Near Muar.—Mr. Savage mapped as volcanic three small hills about eighteen miles north-east of Muar on the left bank of Sungei Muar.

Ma' Okil.—Bukit Ma' Okil is about eighteen miles north from Batu Pahat. Metamorphosed andesite, basalt, and dolerite occur in the range extending south-west from this hill to near Kangkar Senangar, and a noteworthy feature of the metamorphism is the presence in the rocks of very abundant tiny grains of haematite.

Altered Rhyolite at Kangkar Senangar and Bukit Pengerang.—In the undulating country near the small village of Kangkar Senangar there are numerous large boulders of a peculiar, white, grey, or cream-coloured, soft stone, homogeneous in appearance, except for occasional streaks due to iron-staining, and exceedingly fine-grained. A rock of the same type, exposed *in situ* in a new quarry $1\frac{1}{2}$ miles south of the village, is an agglomerate of pieces of the soft stone embedded in a matrix of the same material, occurring as beds about 2 feet thick, separated by clayey material, and dipping 30° to the east. Its structure under the microscope suggests altered rhyolite-tuff.

A similar rock occurs at Bukit Pengerang in South-east Johore, and specimens here also suggest that some of it is altered rhyolite-tuff, so it is thought that the fine-grained homogeneous rock, both at Kangkar Senangar and Bukit Pengerang, is probably altered rhyolite.

Analyses by Mr. J. C. Shenton, Chemist, Geological Survey Department, F.M.S., are:—

	Kangkar Senangar	Bukit Pengerang
SiO ₂	44.06 per cent.	44.80 per cent.
Al ₂ O ₃	41.00 " "	40.16 " "
Fe ₂ O ₃	.20 " "	.64 " "
CaO	trace	
MgO	1.60 " "	
Na ₂ O	2.08 " "	
Loss on ignition	14.10 " "	13.52 " "

The analyses agree very closely with the composition of kaolinite, and there is no resemblance at all to the chemical composition of rhyolite. This subject will be returned to in a discussion on the origin of the Sri Medan haematite-ore.

Bukit Belungkor and Bukit Pelali.—Bukit Belungkor is built of andesite-lava and andesite-tuff, with some rhyolite also. Metamorphosed rhyolite and tuff occur on the north side of Bukit Pelali.

Bukit Nanas.—The quarries on this small island at the east end of the Johore Straits give very interesting exposures of tuff and lava. At the south-east corner of the island is seen a rhyolite lava-flow, ten feet thick, overlain and underlain by beds of volcanic agglomerate, and broken up by numerous small faults. The tuff and agglomerate here, and in quarries on the north side of the island, contain numerous fragments of granite, evidently torn by explosions from the sides of a volcanic vent passing through a granite-mass, and, as the volcanic rocks are older than the Mesozoic granite, the granite-fragments must have come from a Palaeozoic granite. There is no doubt that the volcanic rocks are older than the Mesozoic granite, for they are intruded by quartz-tourmaline veins, they are tourmalinised, and, most striking of all, they have been subjected to an intense heat-metamorphism which has developed secondary biotite and dark-green hornblende in them.

Pulau Pisang.—The three islands known as Pulau Pisang about nine miles from the south-west coast of Johore consist of volcanic tuff. Pebbles of radiolarian chert and granite were found by Mr. Scrivenor on the beaches there.

Tanjong Penyabong to Pulau Stindan.—At Tanjong Penyabong there is much-weathered rhyolite containing a considerable amount of secondary calcite. It is a non-crystalline, whitish, fine-grained, sandy-looking rock. At Tanjong Resang are large exposures of similar altered rhyolite, homogeneous, and closely jointed, the joints being about half an inch apart, and with changeable directions. The rhyolite-agglomerate on the lower slopes of Bukit Arong has already been mentioned, and hard, fine-grained rhyolite-tuff also occurs there. It was interesting to find that the summit of Bukit

Arong is a quartz-reef intrusive into the volcanic rocks. This great vein is continued out to sea, where it stands up to form the white cliffs at Tanjong Arong.

Rhyolite-lava and tuff build up Tanjong Selantai, Batu Gagah, and Pulau Stindan, and at Kampong Ayer Papan, several miles inland from Tanjong Selantai, are andesite-tuff and rhyolite-tuff, in which, under the microscope, the original form of numerous glass-fragments can still be seen.

Pulau Keban and Pulau Ujol.—The beautiful hexagonal columns (Plate XXXV) formed by jointing in the quartz-porphry or rhyolite of Pulau Keban and Pulau Ujol, islands close to Tanjong Penyabong, were described earlier in this account. The rock is so hard and resistant to weathering as compared with rhyolite at Tanjong Penyabong, and on neighbouring islands, that one is led to conclude that it is hypabyssal, and that it never contained the steam-holes and cavities which rendered the lava-flows more liable to attack by alteration. On Pulau Ujol there are gently-inclined, faulted sills of andesite intrusive into the quartz-porphry (Plate XXXV, fig. 2).

Pulau Tinggi.—Part of the east coast of Pulau Tinggi, and the whole of Pulau Ibol, a small island which lies about half a mile from the east coast of Tinggi, is made of a mass of granophyre, whose even, fine-grained structure shows that it is only a small intrusion. The mass of granophyre may be connected with the subterranean magma which provided the volcanic lava and ash that builds the greater part of Pulau Tinggi, or it may be of a later period than the volcanic rocks, and the same age as the granite of Pulau Aur and Pulau Babi, for the granite of the last-named island has a micrographic structure rather like that of the Pulau Ibol granophyre.

The beaches of Pulau Ibol and of this part of the east coast of Pulau Tinggi are covered with rounded pebbles of the granophyre, which would provide excellent material for a ball-mill. In 1925 a pottery-works in Johore was grinding pottery-materials in a mill with quartzite-balls which had been imported from Sweden. Any further supplies could be obtained on the east coast of Pulau Tinggi, and another use has been found for a large quantity of pebbles from this deposit as a filtering-medium in the mechanical filters at the Gunong Pulai water-reservoir.

The remainder of the island of Pulau Tinggi is built up of lava and tuff, which in the northern part, display evidence of shearing. Much rhyolite occurs, but though the consolidated volcanic ashes (tuffs) contain numerous fragments of andesite, yet no andesite lava-flows have been seen *in situ*. An ascent was made to the highest point of Pulau Tinggi, and the last 400 feet are very steep indeed, consisting of almost vertical cliffs of volcanic tuff.

Pulau Sibn.—Rhyolite, with a whitish, sandy, non-crystalline appearance like that at Tanjong Penyabong, is common on Pulau

Sibu, and at the north end of the island are exposures showing several hundreds of feet of such rock. The lower part of the cliffs is built of well-bedded rhyolite lava-flows, dipping 15° towards the south, and the upper part is tuff in which there is little sign of bedding. Sills of rhyolite are intrusive into the tuff, and quartz-veining is common. On the east side of the island similar good exposures of rhyolite and tuff occur, but here the dip is 70° towards south-west, showing the disturbed nature of the beds.

The Granite and Allied Rocks.

While the various granite-outcrops in Johore often display the rock-type which is commonest in the other States of the Peninsula namely a coarse-grained rock, consisting essentially of quartz, felspar, and biotite, much of the felspar occurring as large porphyritic crystals, yet more common still in Johore is the type in which there are no porphyritic felspars. Good examples of granite with porphyritic felspars are seen at Bukit Muar, while the non-porphyritic granite is developed at Gunong Pulai, Mount Ophir, and at Pulau Babi in the China Sea. Pink felspar is common at Gunong Blumut and at Gunong Pulai.

Non-porphyritic hornblende-granite is frequently met with, though it is less abundant than ordinary granite. Diorite and syenite too are known, and there are two occurrences of gabbro, one near Segamat and one on Linden Estate, east of Gunong Pulai.

Distribution of Hornblende-granite.—Looked at in a broad way, the acid type of granite with little hornblende is dominant near the west coast of Johore, as at Mount Ophir and in the Muar District, while the hornblende-granite and syenite are wide-spread in the east. There is hornblende in some of the granite near Sedenak, and near Hill 75 and Bukit Besar, north of Johore Bahru. Some hornblende-granite occurs amongst the acid granite of Gunong Blumut and is still more common in the Ulu Endau granite of Gunong Besar and Gunong Bekok. Syenite has been found in an outcrop near Sungei Palong near the north-west corner of Johore. According to Mr. Fulton, hornblende-granite is the dominant type near Gunong Muntahak, and in the outcrop to the north-east of it. There is hornblende in some of the granite at Bukit Pelali, where tin-deposits are being worked, but the common type there does not contain hornblende.

Distribution of Tin-Deposits.—On the whole, the rule that tin-deposits are not likely to occur near hornblende-granite is true for Johore, as elsewhere in the Peninsula, but an exception is afforded by the hornblende-granite and syenite of Pulau Aur where tin-deposits are known.

Modifications.—Aplite, pegmatite and vein-quartz, which are commonly associated with granite everywhere, are abundant in Johore wherever tin-deposits have been found, and Mr. Fulton says that in Ulu Senteroh, a valley east of Gunong Blumut, there is a

strong contrast between the tin-bearing granite and the neighbouring hornblende-granite country, which has produced no tin.

A large muscovite-aplite intrusion forming the hills south-east of Gunong Muntahak seems to be the same rock which is associated with gold-deposits in Pahang, Negri Sembilan, and Kelantan, for Mr. Fulton reported traces of gold to occur near it, in the bed of Sungei Pelepah.

China-clay is being worked for pottery in a soft pegmatite-vein at Sungei Perpat, a stream which flows into the Johore Straits on the west side of Johore Bahru.

Gabbro.—The rock on Linden Estate is a gabbro of the usual type, consisting essentially of hornblende, augite, olivine, and labradorite, and some, if not all, of the hornblende has been formed by the alteration of the augite. In addition to the coarse-grained gabbro there are abundant patches of fine-grained, dark diorite.

Age.—The granite of Johore seems to be of Mesozoic age, like that elsewhere in the Peninsula. As already described, some fragments in tuff on Pulau Nanas were derived from another granite, Palaeozoic in age, but this Palaeozoic granite has not been recognised *in situ* in Johore. The age of the gabbro near Segamat and at Linden Estate has not yet been determined.

High-Level Alluvium.

Lithology.—High-level alluvium was first described by Mr. Scrivenor as occurring on Singapore Island. In contrast to the ancient schists, phyllites, quartzites, and shales, this formation has not been hardened by regional metamorphism.

In some districts it is a well-bedded deposit of sand, clay, and rounded pebbles, arranged in layers one or two feet thick, horizontal or gently-dipping, and in others, as between the 22nd and 31st milestones from Kluang on the road to Mersing, and between Johore Bahru and the 14th mile on the road to Kota Tinggi, it is a thick unbedded deposit of rather coarse quartz-grains imbedded in a matrix of white kaolin-like clay. This latter deposit has probably been formed by the erosion of granite-outcrops, for it always occurs near granite, and it is given the appropriate name of "granite-wash." In other places again, as at Tanjong Penyabong, near Tanjong Buai, in the estuary of Sungei Johore, beds of the granite-wash are interstratified with layers of clay, sand, and pebbles.

The thickness of the formation is unknown, but it is probably greater than that of the high-level alluvium in Kinta, where the depth is more than two hundred feet.

Age.—The high-level alluvium at Tanjong Penyabong contains logs of fossilised wood which were examined by Mr. R. E. Holttum, Assistant Director of Gardens, Singapore, and pronounced to be "Dicotyledonous wood, representative of the flora of recent times." In no exposure are the beds veined with quartz.

Tin-Deposits in High-Level Alluvium outside Johore.—Outside Johore, in the Kinta District of Perak, much of the high-level alluvium is tin-bearing, but tin-deposits have not yet been found in this formation in Johore.

Various Exposures.—The flat or gently-undulating nature of the country which they form makes it an uncommon thing to see an exposure of the beds. They are seen in occasional river-bank or sea-cliff exposures, as in Sungei Ridan, at Tanjong Penyabong, and at Tanjong Sengat, in the estuary of Sungei Johore, or in Sungei Sembrong, about 8 miles downstream from the mouth of its tributary Sungei Kahang, or in Sungei Johore between Kota Tinggi and Kampong Semangar. Another exposure is seen in a railway-cutting at mile 398½, between Bekok and Paloh, where there are horizontal beds, several feet thick, of alternating shingle and sandy clay, in which the pebbles are of quartz-porphyry, a rock which occurs *in situ* in the neighbourhood.

At mile 417¾, north of Kluang railway-station, thin seams of lignite were found by Mr. J. B. Scrivenor in granite wash.

Near Johore Bahru.—A hill is being excavated at a spot 300 yards north of milestone 1½ on the coast road going west from Johore Bahru, where an artificial cliff, 40 ft. high, gives an excellent exposure of high-level alluvium, displaying mauve-coloured and grey clay interbedded with sand and "granite-wash." On the whole, the beds are horizontal, but in one place they have a dip of 15° or 20° towards the north-east, and there is some false-bedding which has given varying dips to neighbouring layers. Ironstone bands as much as 4 inches thick, due to weathering, occur in the sandy beds, usually approximately parallel with the bedding, but sometimes cutting across it.

Near milestone 7½, Skudai Road.—In May, 1927, excavating work had made a clear exposure 30 ft. high in the left bank of Sungei Skudai, at milestone 7½ on the Skudai road, where there was an approximately-vertical contact of granite with horizontal layers of heliotrope-coloured clay and pebble-beds. The granite had been weathered soft enough to be cut with a knife, but was still *in situ*, as was proved by a number of softened quartz-veins which preserved their unbroken course in it.

They all ended abruptly at the contact; none passed into the high-level alluvium. The alluvial beds seemed to have reached their present position by faulting, and the vertical plane of contact was a fault-plane. Streaks of pink clay parallel with it suggested a clay-band in the high-level alluvium that had been dragged out along the fault. Throws of one foot each could be measured in a succession of half a dozen step-faults that cut across a bed of clay, but the faulting was of very recent date, probably due to landslips.

Road near Gunong Pulai.—Boulders near the 12th and 20th mile indicate high-level alluvium, and there is a good clear road-cutting through it at milestone 22¼, where there are horizontal beds [1928] *Royal Asiatic Society*.

of pebbly-clay and boulders. The boulders are sometimes as much as two feet across and consist of sandstone, conglomerate, quartz, and shale, with a few of granite. In cuttings near milestone 23½ are exposed weathered Triassic rocks, including purple shale, sandstone, and conglomerate, and in contrast with the alluvial beds at milestone 22¼, the strata are vertical, or dipping very steeply, and veined with quartz. The erosion of these beds provided the material for the high-level alluvium.

Coastal Alluvium and River-Deposits.

There is little to add to what has been written elsewhere about the coastal alluvium. It probably consists of interbedded blue sands and sandy clay, as it does elsewhere in the Peninsula, and it has been deposited along the shore-line while the sea has been practically at its present level.

Mode of Origin of the Coastal Plain.—One can compare the building of this coastal plain to the gradual lengthening of a dam, by workmen, who take earth from a hill, truck it along the dam to the end, and there dump it over. The height of the dam remains constant, its length gradually increases. Except for a slight elevation of a few feet at the beginning of the period, as indicated by a beach of sea-sand near the Batu Pahat granite, and at various other places, many miles from the sea, the building of the coastal plain has gone on just like the process of lengthening the dam. It is likely that the sea-shore shelved downwards from the land, and so the depth of alluvium near the sea is greater than that further inland. Only on and near the present surface of the plain is there likely to be peat, and any vegetable-remains found below the surface must have originated from water-logged wood that sank to the sea-floor.

Bearing in mind the method of formation of the coastal alluvium, it is clear that the individual beds cannot be expected to have any great lateral extent, and bores put down in the Selangor alluvium show that this really is the case. It will also be seen that the vertical depth of alluvium is no indication as to the age of the deposit, any more than is the height of our hypothetical dam a clue to the length of time it took to build. The width of the plain, corresponding to the length of the dam, is the factor.

River-Deposits.—The river-deposits of Johore include boulder-deposits, shingle, and sand, like those in other parts of the Peninsula, and where the country-rocks are tin-bearing, cassiterite occurs in the river-deposits.

The Tin-Mines and Occurrences of Tin-Ore in Johore.

The tin-mines will be treated in order according to their geographical distribution.

Muar.—Some of the granite at Muar is tin-bearing, and tin-ore was worked about twenty years ago at the 10th mile on the road to Bakri.

Batu Pahat.—Some of the granite at Batu Pahat is tin-bearing. In notes written by Dr. W. R. Jones in 1913 there is mention of a mine "near the Resthouse", but there are no tin-mines in this neighbourhood now.

Kuala Taku, Ulu Endau.—In March, 1925, there were small workings in river-deposits near Kuala Kinchin, and four coolies were getting two or three pikuls of tin-ore a month from a small pit (*lombong*) which they had dug in the bed of a stream, near a contact of granite with Pahang Volcanic Series rocks. Some of the granite contains hornblende.

Tanah Abang.—River-deposits and soil on the west side of the Tanah Abang granite hill were being worked in a *lombong* in 1920 or thereabouts, but there were many great core-boulders of granite which hampered operations, and the expenses of blasting them caused the mine to be abandoned.

Near Kluang.—There is a mine on the south side of the road from Kluang to Mersing, about seven miles from Kluang, probably connected with a granite-intrusion.

Jemaluang.—There are tin-mines near the road at Jemaluang, about 13 miles from Mersing, in weathered quartzite-and-shale country near the margin of an intrusion of non-porphyrific granite. One mine is a *lampan* in sandstone veined with tin-bearing quartz-stringers that have brought the tin-ore. At Ulu Mersing, a few miles from the road, there are a number of *lombongs*, but the valley seems to be nearly worked out. In a tributary east of Sungei Mersing, is a mine that was employing 40 men in July, 1926. Mining began there about the year 1918 and a good deal of tin-ore was won then, but the output has since fallen a great deal.

Near Bukit Wah Wah.—Eu Kai Song's Mine was opened in June, 1926, and 30 men and one engine were working the soil on a hill of flat-bedded shale. Though the soil was sandy and contained much vein-quartz, yet no quartz-veins *in situ* were seen in the shale.

Ulu Madek.—A gravel-pump mine was opened up in Ulu Madek in 1924, and there were also lode-workings, with a shaft about 100 feet deep. At the best, they used to get 100 pikuls per month with 200 coolies, but in July, 1926, there were only 60 coolies, and in 1927 work had stopped.

Ulu Senteroh.—Mr. G. R. Fulton examined this district in May, 1923, and described a valley, about three miles east of the summit of Gunong Blumut, that was covered with prospecting-pits. There were a few deserted small *lombongs* and a few *lampans*, and it could be seen that the tin had originated from granite veined with pegmatite and aplite.

Ulu Dohol.—Towkay Tan Kiam Guan began to work a *lombong* in river-deposits in August, 1925, on lot 1244 in Ulu Dohol, and up to October 22nd 1925, when the mine was visited, he had got about 20 pikuls of tin-ore, with 40 coolies working. The tin-bearing gravel (*karang*) exposed in the *lombong* was 6 or 7 feet below the soil, and was about 18 inches thick. Bedrock was weathered granite, but the hills to the south are built up of micropegmatite, a fine-grained modification of the granite.

Lode in Sungei Tampenis.—Towkay Leong Ang Ee began to open up a lode in micropegmatite, in July, 1925. It consisted of a number of thin quartz-veins, and veins of quartz-muscovite rock, which, however, only contained cassiterite in part of their course. In October, 1925, a shaft had been sunk for 85 feet, and from a depth of 65 feet a tunnel was being driven into the hill-side. Prospects did not seem to be good.

The Lenggü and Tengkil Mines.—Operations have been carried on for some years in shallow valley-deposits in granite-country in Sungei Lenggü and Sungei Tengkil. When the mines were visited in October, 1925, the depth of the river-alluvium in the Lenggü Mine and the Tengkil Mine was about 10 to 15 feet and the *karang* varied up to 7 feet in thickness. Bedrock (*kong*) was soft, decomposed, coarse-grained granite, but a large inclusion of schist enclosed in the granite on the floor of the Tengkil Mine showed that probably the main contact with the old sedimentary rocks was not far away. In both mines the ground was broken down by monitors, and elevated by gravel-pumps, and the machinery was on pontoons which could quickly be floated to a new scene of operations when the shallow ground of one locality had been worked out.

Mr. Fulton saw a few flakes of molybdenite on the granite floor of the Lenggü Mine in 1922.

The Middleton Mine, about one mile upstream, was let out to a Chinese, who worked it as a *lampan* with 12 coolies, getting 10 or 12 pikuls of tin-ore per month.

East of Sungei Tengkil.—About three miles east or south-east of the Tengkil Mine, there were two mines operating in October, 1925, near the old Royal Johore Mine. One was a new *lombong* with 16 coolies and they had not yet reached *karang*. In the other, owned by Towkay Loke Hok Chow, 38 coolies were ground-slucing the soil of a granite hill, in which the abundant schist-pebbles showed that a contact was not far away. Mr. Fulton had inspected this mine in January, 1922.

Senopa Tin Mine.—In January, 1922, when Mr. Fulton went to the Senopa Tin Mine he found it being worked under European management, but in 1925 it had been abandoned for some time. It was operating in river-deposits lying on weathered granite, 1½ miles east of Kuala Tengkil.

Tunjoh Laut.—The old mining land on the south side of the granite hill Bukit Tunjoh Laut was examined in October, 1925. It had been worked a few years before, but operations had proved unsuccessful.

Kambau Mines.—The Kambau Mines also were examined in October, 1925, in Ulu Sungei Payong, a tributary of Sungei Sedili Besar, and about four miles from the sea-coast at Sungei Paloi. Operations were on a small scale, and consisted of *sluicing* shallow soil on low granite-hills, with water lifted 42 feet from a marsh by means of a 12 h.p. steam-pump. There were 49 coolies at work, and they had got 180 pikuls of tin-ore in the previous 5 months. All the ore was fairly fine-grained, and it contained a considerable amount of monazite.

Bukit Pelali.—In October, 1925, about 200 pikuls of tin-ore per month were being produced by *lombongs* in Ulu Sungei Rengit, on the south side of Bukit Pelali, the *karang* being from 10 to 40 feet below the surface. All the successful mining had been in one valley, about half a mile long, and 50 to 150 yards wide, and the richest parts were nearly worked out, so it augured ill for the life of this small tin-field that prospecting in the wider, downstream part of the valley with the idea of floating a dredging-proposition had been a failure.

Bukit Pelali and the attendant hills lying on the north side of the valley are built of a very fine-grained altered quartz-felspar rock (felsite), which apparently is not tin-bearing, for prospecting in these hills gave very poor results. The hills on the south side of the valley are granite, of the ordinary coarse-grained type, and the formation of tin-deposits is, no doubt, connected with the presence of this rock.

Pulau Aur.—Pulau Aur is the most easterly island in British Malaya, about 50 miles from the mainland. A trip to the island in July, 1926, revealed the presence of cassiterite in a beach-deposit of black, ilmenitic sand, samples of which assayed 0.6 per cent of metallic tin. Prospecting work was carried out in the north-west part of the island, and deposits of tin-ore were found in the soil of a small plain of two or three acres, at a height about 100 feet above sea-level, half a mile from the shore, but unfortunately the deposits were too small and too low-grade to be workable. Samples from the surface to a depth of four feet assayed 0.45 pounds of metallic tin per cubic yard, and then the values fell away as the decomposed granite was entered.

Other pits and bores, sunk in sand on the shore in the north-west and on the east side of the island all gave values, varying from 0.2 pounds of metallic tin per cubic yard to a trace.

Pulau Aur is built of hornblende-granite and syenite, a remarkable rock-assemblage to produce tin-deposits.

Prospects of Mining in Johore.

It will have been noted, after reading the preceding description, that all the tin-mines of Johore, with the exception of the lode in Sungei Tampenis, are operating in soil or shallow river-deposits. Similar short-lived river-deposits will probably be found near granite-margins in various parts, such as that near Jemaluang, or in the Linggiu and Tengkil neighbourhood. In 1922 Mr. Fulton recommended prospecting north of Gunong Muntahak, near the north-and-south granite-margin across which flow the rivers Sikat, Kayu, and Berasau, because he had found tin-ore in white clay in one of the tributaries of Ulu Berasau.

Similar deposits should be sought for near the granite-margin that runs from near Kluang to Gunong Pu.ai, for a trace of tin was found in weathered granite on an estate on the Rengam Road, and this is an indication that it may be worth while prospecting the valley-alluvium of the neighbourhood.

Some of the river-deposits of granite outcrops near Muar are likely to be worth mining.

Ulu Endau is not promising.

The areas above-mentioned are clearly not to be regarded as potential large tin-producers.

The high-level alluvium of Kinta has been mentioned as containing tin-deposits, and it may be that alluvial tin-deposits were formed in the high-level alluvium of Johore, near the margins of tin-bearing granite. If this is so, it is likely that large paying reserves still remain undiscovered in Johore, hidden by the considerable depth of the formation. It certainly seems to be advisable to test the possibility, and boring-sets capable of going down to a considerable depth, 150 feet to 200 feet, should be used. In August, 1927, a trace of tin-ore was found in *amang* in the plain that abuts on the western side of Gunong Blumut, and the deep deposits here should be prospected. Another possibility is the granite-wash from the 22nd to the 31½ mile on the road from Kluang to Mersing.

The Bukit Medan Iron Mine.

Much of the following information was supplied by Mr. H. Ishihara, President of the Nanyo Kogyo Koshi, the Company that owns the mine.

Output.—The Bukit Medan Mine produces each month about 30,000 tons of haematite-ore of exceptionally good quality, assaying 64 per cent of metallic iron, and the output is expected to rise. All of it is exported to Japan and represents about 40 per cent of the total amount of iron and steel used by her.

Situation and size.—An isolated hill known as Bukit Medan or Sri Medan, 313 feet in height above river-level, is the source of the ore, situated in a swamp near the left bank of Sungei Simpang

Kiri, at a point about 10 miles north of Batu Pahat. The hill is 58 chains long measured from north to south, and 46 chains from east to west, and is built up solely of haematite-ore and a kaolin-like clay.

General Description.—The highest part of the hill, where all the haematite-outcrops are, measures 19 chains from north to south and 11 chains from east to west, and has an area of 16 acres of exposed iron-ore, with little or no covering of soil. Farther down there is an increasing thickness of soil. At present, productive work is confined to quarrying the upper part of the hill on various levels. Trucks, each holding one ton of ore, are filled with broken ore at the quarries, and thence run down an incline to the main track leading direct to hoppers on the wharf, from which the ore falls into barges moored below.

Over 1000 persons were living on the mine when it was last visited in August, 1927, and 400 of them were Cantonese mine-coolies. They received 45 to 70 cents for each truck loaded with ore, the exact amount varying with the difficulty of the place where they were working, and the men who pushed the trucks to the wharf got 12 cents per truck. A new wharf and new inclines were being built, and, when finished, the cost of pushing trucks was expected to be only 8 cents.

In August, 1927, the Company owned 47 barges (*tongkangs*), each holding 70 tons of ore, which were towed by motor-launches 18 miles downstream to Batu Pahat, and thence 6 miles to steamer-anchorage out at sea. If the sea was rough, the ore could not be transferred from the barges to the steamers, and it sometimes happened that as many as three ships were lying idle, waiting for suitable weather. Five steamers belonging to the Company, with 10 chartered steamers, were fully occupied plying between Batu Pahat and Moji (Japan), laden with iron-ore. A steamer took 1½ months to do the trip direct, returning empty; it took 2 months bringing back coal from Moji to Hongkong or Manila.

IRON ORE AT SRI MEDAN MINE, JOHORE.
Details supplied in August, 1927, by Mr. H. Ishihara, the President of the Nanyo Kogyo Koshi Company.

Year	Total out-put in tons	Quality	ANALYSES					IRON	
			Ore					P ₂ O ₅	Copper
			H ₂ O	Fe	Mn	SiO ₂	SO ₃		
1921	18,536	Maximum assay-result	2.12	66.14	0.26	2.14	0.022	0.133	0.040
		Minimum	0.98	65.47	0.20	1.34	0.010	0.082	—
		Average	1.71	65.76	0.24	1.89	0.13	0.102	0.021
1922	128,520	Maximum	2.57	66.24	0.26	2.63	0.236	0.278	0.022
		Minimum	1.80	63.86	0.10	0.73	—	0.132	0.008
		Average	2.29	64.43	0.15	1.64	0.037	0.197	0.014
1923	169,232	Maximum	3.40	66.29	0.26	3.72	0.081	0.235	0.064
		Minimum	1.70	62.31	0.05	0.78	—	0.155	—
		Average	2.70	63.96	0.15	2.03	0.024	0.192	0.019
1924	177,789	Maximum	3.47	65.46	0.27	4.96	0.074	0.323	0.056
		Minimum	1.94	60.00	0.09	1.36	—	0.180	—
		Average	3.035	63.63	0.16	2.43	0.030	0.240	0.039
1925	231,536	Maximum	3.58	65.26	0.21	2.99	0.074	0.260	0.068
		Minimum	2.44	61.18	0.08	0.96	—	0.114	—
		Average	3.08	63.68	0.13	1.62	0.059	0.207	0.013
1926	231,000								

Estimate for 1927, 350,000 tons.

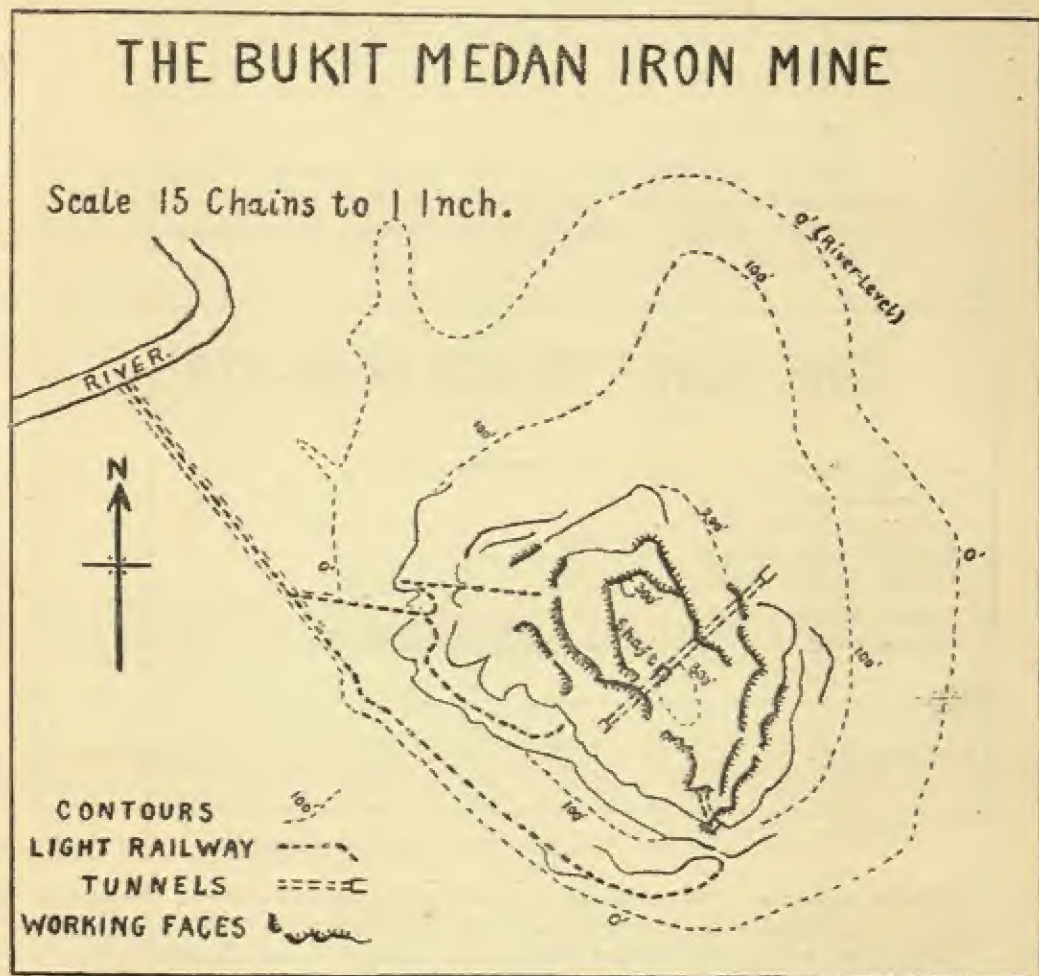
Year is counted from April 1st to March 31st.

E. S. Willbourn.

The table on page 30 gives details of outputs since 1921, when the mine was opened, with assay-results.

Geology of the Bukit Medan Iron Mine.

Figure 1 is a plan of the mine. It shows the various quarry-faces and the position of prospecting-tunnels that have given some information about the underground-shape of the ore-deposit.



Prospecting.—In 1926 and 1927 an extensive boring-programme was commenced to explore the deposit in depth, with a diamond-drill, but the drill could not cope with the haematite, and so boring-operations were confined to the swamp, and to those lower slopes of the hill where no ore could be seen. One bore-hole alone, in swampy ground at the north-west end of the hill, met hard rock other than haematite, and bottomed on metamorphosed shale at a depth of 123 feet.

However, various tunnels gave a considerable amount of information. One of total length 1044.2 feet, was driven through the hill, beginning in the south-west at a height of 160 feet above river-level, and emerging on the north-east side at a height of 175 feet, and a shaft sunk from the highest point of the ridge to meet it was in haematite the whole way.

Form of the Ore Deposit.—Figure 2 gives a section along the tunnel, and the probable shape of the ore-deposit, and the following is a description of the tunnel as seen in August, 1927, beginning at the eastern end.

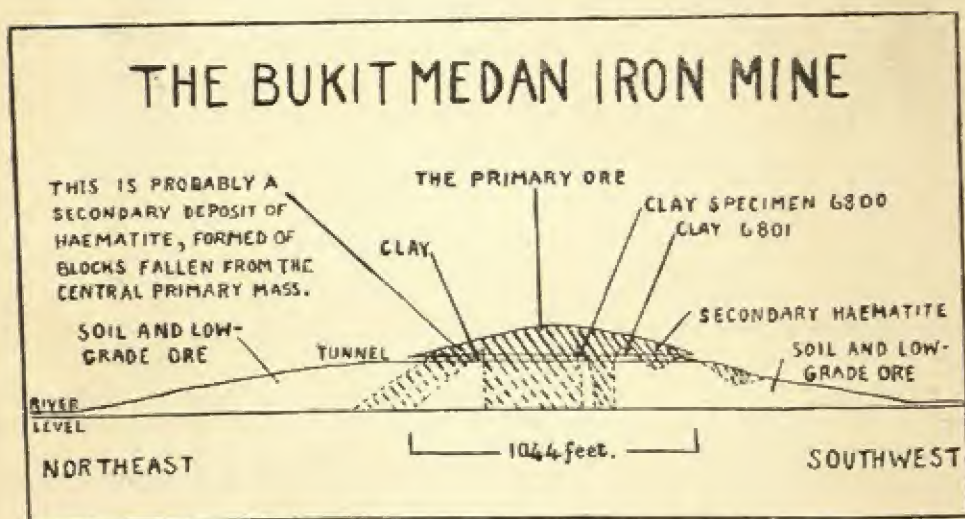


FIG. 2

SECTION DRAWN FROM INFORMATION FURNISHED BY THE TUNNEL THROUGH THE HILL. THE ONLY ROCKS, APART FROM SOIL, ARE HAEMATITE AND A KAOLIN-LIKE CLAY. THE DETAIL SHOWN BELOW THE LEVEL OF THE TUNNEL IS INFERRED, NOT PROVED.

The tunnel-mouth was in red earth which underlay good haematite-ore exposed in quarries higher up the hill, and this red earth continued for over 150 feet into the hill where a mottled clay was

encountered, some of it veined with kaolin-stringers. The veining suggested that the clay was an ancient rock *in situ*, perhaps older than the Mesozoic granite.

From a point 200 feet from the east end, to 170 feet from the west end, there was 670 feet of primary haematite and clay *in situ*, the haematite brecciated, with lumps of clay included in it. The last 170 feet of tunnel, at its west end, went through 90 feet of haematite followed by 60 feet of red earth.

The red earth at both ends is soil that has slipped down the hill-sides, and the haematite associated with it is secondary ore.

The Clay.—The clay resembles impure, stained kaolin. The following are analyses, by Mr. J. C. Shenton, of samples taken from points in the tunnel where the clay was *in situ*.

Sample No.	6370	6800	6801
SiO ₂	31.80	34.00	47.80
Al ₂ O ₃	24.06	21.58	21.60
Fe ₂ O ₃	30.80	31.22	16.80
CaO	0.40	0.32	0.76
MgO	0.25	0.64	1.02
P ₂ O ₅	0.10	0.10	0.15
Loss on ignition	12.26	10.70	10.74
	99.67	98.56	98.87

To get at the composition of the original substance, it is necessary to re-calculate the percentages after deducting the figure for ferric oxide, and samples 6370 and 6800 then give results which correspond closely with kaolinite, and with the soft stone, thought to be altered rhyolite, at Kangkar Senangar and Bukit Pengerang.

Kangkar Senangar is only 6 miles away. As already described, the hill-range between there and Bukit Ma' Okil has occurrences of altered dolerite and andesite that are impregnated with grains of haematite, and it is now suggested that the clay at Bukit Medan is the same rock as that at Kangkar Senangar, softened by weathering.

It should be noted that Mr. J. B. Scrivenor found kaolin in a well on the mine, in 1920.

The Haematite and Associated Minerals.—The great mass of ore consists of a hard, massive, compact, grey, sub-metallic-looking ore, that gives the characteristic blood-red streak when scratched with a knife. Some of the secondary ore is pebbly in character. Haematite has chemical composition; Fe, 70%. O, 30%, corresponding to the formula Fe₂O₃, and it can be seen that the average bulk-assay of 64 per cent Fe for all ore exported from the Mine is extraordinarily high, much higher than that of ore usually smelted in Europe and America.

Some magnetite (Fe_3O_4) has been seen, but it is not common.

Well-shaped octahedral crystals of martite, a mineral with the same composition as haematite, but with the isometric crystal-form characteristic of magnetite, were common in October, 1925, in a quarry on the west side of the south end of the hill.

Near shute G, at the south end of the hill, are cliff-outcrops of very hard ore, containing an unusually high percentage of phosphorus, and an examination with a lens shows that it contains abundant prism-shaped crystals of apatite. Occasional thin quartz-veins traverse this ore, and druses are lined with tiny quartz-crystals. A few cavities contain, besides quartz, pink, yellow, and green, acicular crystals of a transparent orthorhombic mineral with specific gravity determined as 2.82. An approximate analysis by Mr. Shenton, made on the small amount of material available (No. 6742) showed it to consist of iron, phosphorus, and water, and the mineral is either phosphosiderite, $2 \text{FePO}_4 \cdot 3\frac{1}{2} \text{H}_2\text{O}$, or strengite, $\text{FePO}_4 \cdot 2\text{H}_2\text{O}$.

A microscopical examination shows that chalcedony is present in the haematite at this end of the hill.

Provisional Theory as the origin of the Haematite-ore.—The evidence at present available is not sufficient to warrant a definite statement about the origin of the ore. A provisional theory, formed by the writer, is that a plug of rhyolite or quartz-porphyry, was subjected to some hydrothermal process which removed much of the quartz and silica, converted the rock into kaolin, and at the same time deposited haematite. If the hill is really part of a volcanic plug, there should be very large reserves of ore underground, but it must be emphasized again that this is not a firm theory. There is not yet sufficient evidence to justify a more definite statement.

Other Iron-Ore Deposits in Johore.—Mr. Fulton described the following occurrences in the Geologist's Annual Report for 1922. The last three are favourably situated for transport.

Kota Tinggi District.—The northern end of the ridge dividing Sungei Seluang from Sungei Persisek, tributaries of Sungei Johore, seems to be composed almost completely of iron-ore. For nearly a mile down a small tributary of Sungei Seluang which rises on the mountain, there are large boulders of magnetite, and right across the mountain, from this stream to Ulu Pelepah Kiri (a distance of over a mile), there are numerous outcrops of good haematite, associated with magnetite. The whole of this part of the mountain, up to a height of over 1,000 feet, seems to be composed of iron-ore.

Kuala Pulai.—From Ulu Kramat to Ulu Poh there is a stretch of about two miles of hilly country, with exposures of volcanic and hypabyssal rocks, including several hills composed of a very pure haematite. Other hills are haematite, containing much quartz, which would be more difficult to work, and the area is separated from the coast by a plain two or three miles wide.



A view of Gunung Chabang Tiga (the threepeaked mountain on the left) and Gunung Besar (the left central mountain) from Gunung Pertawai.





*Jeram Pachau, the first formidable rapids, near Kampong Peta.
The rocks are rhyolite.*





Rapids of rhyolite in Siengi Endau.

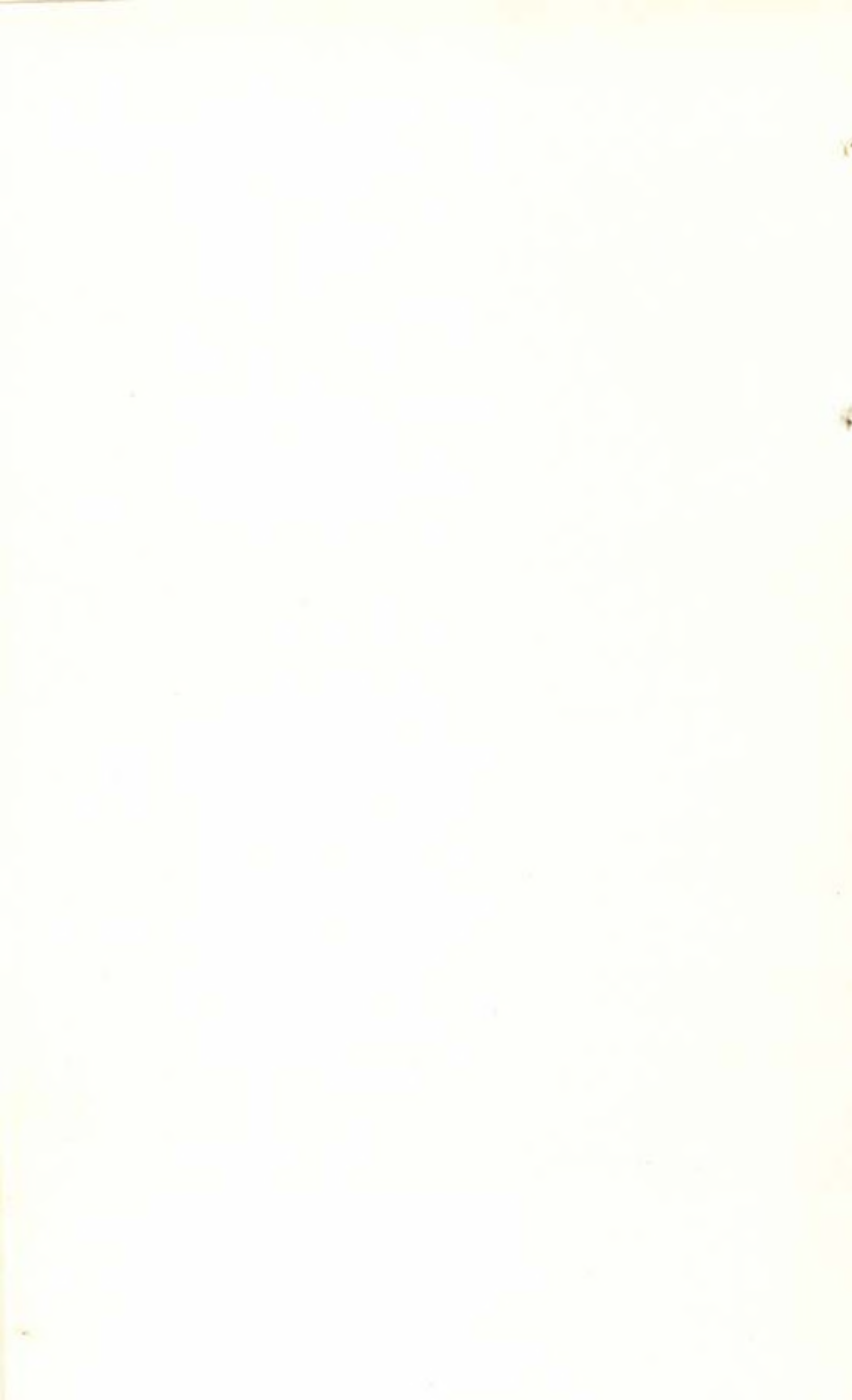


Rapids in Sungai Endau.





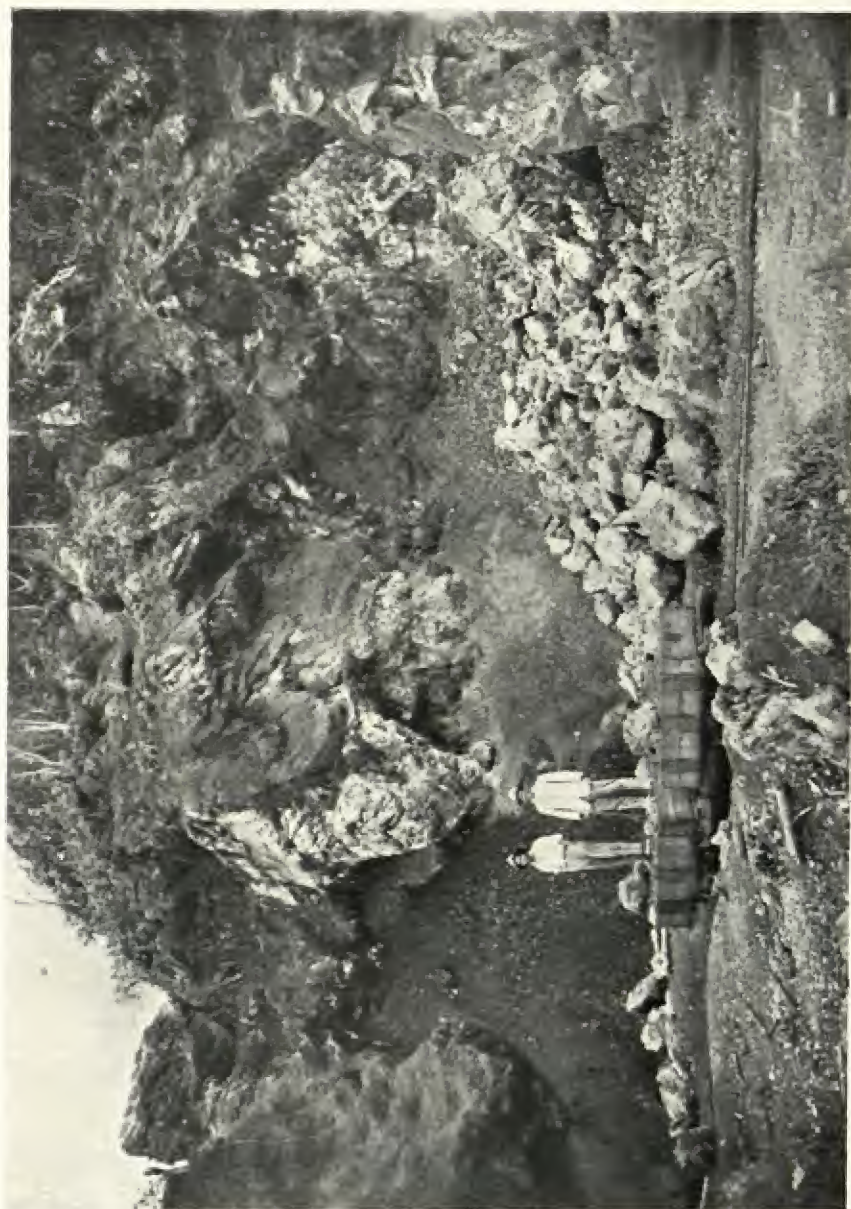
*Sungei Endau below Kampong Peta. From here the river flows
over a flat alluvial plain.*





Quartzite and shale exposed on the shore south of Mersing.





Quarry of haematite at Bukit Medan Iron Mine.

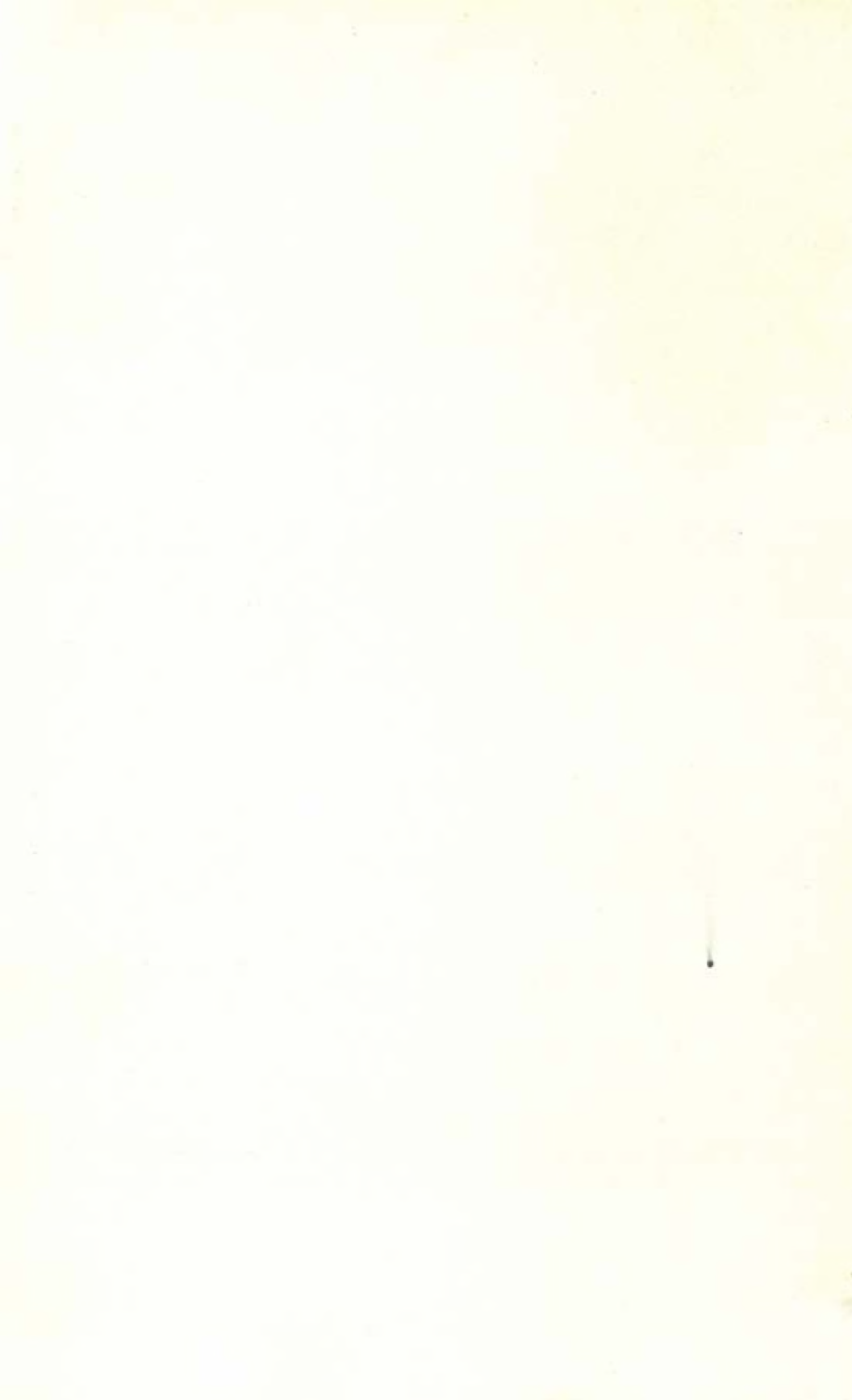




Fig. I. *Rhyolite with columnar jointing at Pulau Ujol.*



Fig. II. *Andesite sills intrusive into columnar rhyolite at Pulau Ujol.*

Kuala Pendas, near Kuala Pulai.—There is a low hill, perhaps 100 feet above sea-level, on the left bank of the river at Kuala Pendas, where outcrops of haematite have been seen, extending for nearly half a mile along the beach.

Tanjong Punggai.—From Tanjong Punggai (south-east corner of Johore) a ridge runs several miles inland in a north-westerly direction to Bukit Suatau, and it is composed of poor quality iron-ore (mostly spongy limonite) which outcrops in large boulders. The same kind of iron-ore is intercalated with the quartz-schists all along this part of the coast from Tanjong Punggai to Tanjong Penawar (incorrectly called Tanjong Setajam on the 1920, three miles to one inch map: Tanjong Setajam is actually one mile north of Tanjong Punggai).

Soils.

The Permo-Carboniferous and Trias formations include rocks varying in mineralogical composition, so their soils too vary a great deal in quality. The best can be expected in areas where volcanic rocks are abundant, the worst where quartzite and conglomerate form the bedrock. Owing to the large amount of quartz introduced by metamorphism, even the Raub rocks form a light sandy soil.

Notes on Some Malay Words.

By C. O. BLAGDEN, M.A., D.Litt.

I have recently had the opportunity of examining a copy made in 1873 of the '*Adat Sēgala Raja-raja Melayu*, a work written in A. H. 1193 (A. D. 1779-80) at the request of the Governor of Malacca of that time. Other copies exist, notably one in the Farquhar Collection of the Royal Asiatic Society's library, which was described many years ago by Van der Tuuk. It is a little treatise on the customary ceremonial attending the birth, and so on, of Malay rajas of olden time, and would be worth publishing. The copy that has passed through my hands was formerly the property of Mr. E. E. Isenberger, a Colonial Treasurer of the Straits Settlements, and has now been acquired by the School of Oriental Studies. It is very neatly written, but not always orthodox in its spelling.

At the end there is a glossary of Malay words several of which are new to me and do not appear to be included in Wilkinson's Dictionary or are differently spelt or defined there. It seems worth while to extract them and append the writer's definitions, but as the words to be explained are not vocalized, I must give them in the Arabic character.

مدوال (or مروال) erti-nya tiang panji-panji nēgēri ya-itu tiang bēndera nēgeri ada-nya. "Flag staff."

لندب اتو سندب erti-nya barang suatu pērbuatan atau pērkataan atau suratan atau pēkēnjaan tiada dēngan لال
mēlainkan dēngan تعلق jua ada-nya. Here the text of the definition is corrupt and I refrain from attempting a conjectural emendation of the definition, but invite the help of others to solve this riddle. There is however a passage in the MS. itself which seems to throw some light on the matter. It is a characterisation of Malay manners and insists on the "golden mean", using such expressions as dēngan pērtēngahan, and tiada dēngan bērlēbeh-lēbehan dan dēngan kēkurangan mēlainkan sakalian di-adakan-nya dēngan kēadaan yang sēdērhana jua ada-nya. It then proceeds as follows: maka orang itu-lah yang di-bilangkan anak yang mējēlis tambahan pula dēngan adab pandai ia mēnyimpan diri-nya maka bērtambah-tambah-lah لندب اتو سندب (sic) ada-nya; sapērti kata hukama, "Hēndak-lah kamu hukuman kērongkongan kamu tatkala di-dalam mējēlis makan dan kukumkan mata-mu tatkala mēlihat pērēmpuan dan tēgahkan lidah-mu dari-pada banyak pērkataan yang sia-sia dan tulikan tēlinga-mu dari-pada pērkataan yang kēji-kēji." The general effect of all this is "moderation and self-restraint." I must add that the Farquhar MS. does not contain this passage; but another

MS., after *měnyimpan diri-nya*; proceeds: *maka běrtambah-tambahlah děngan santun těrtib-nya*; *sapěrti kata* ربحك etc. The following word seems to be a variant embodying much the same idea.

سادیب erti-nya těrtib pada barang pěrbuatan dan pěkərjaan sěmua-nya itu di-pěrbuat děngan lěmah lěmbut děngan běrmalu-maluan. "Fitness and courtesy in behaviour." The form *lěndip* is given in Wilkinson with the meanings "neat, natty, smart"; Winstedt's English-Malay Dictionary has *lěndit* under "neat, as a phrase", and *lěndip* under "smart, spruce, dandy".

ملبو ya-itu ular yang bėsar. "A big snake".

ايواغ erti-nya barang kėlakuan-nya orang itu tiada janggal (جشکل) di-pandang orang. "Fitting," as applied to behaviour.

سلیکن erti-nya tiada dapat těrlayan (ترلاین) atau tiada dapat di-sědiakan sapěrti kahěndak orang itu. The meaning seems to be that it is impossible to render certain expected services. But the word has the form of a verb, and perhaps it may mean "to demand more (*lěbeh*) than is practicable under the circumstances".

داون بعلی itu pada bahasa Mělayu daun امبا In Pali *amba* (Hindustani *amb*) signifies "mango". Possibly that is also the meaning here.

سفغ اتو سفغ سق erti-nya barang sa-suatu děngan di-chita baik pakaian atau pěkakas ya-itu di-bawakan orang sapěrti maksud. Apparently this means the satisfaction of a desire.

سفله erti-nya ya-itu maksud yang těrslut pada tombak lěmbing kědua (كدو) orang ملماكن orang atau lain-nya habis mata sěnjata-nya (سخان) itu. Apparently something wrapped round the shaft of a spear.

جراهن ya-itu sa-orang běrahikan atas sa-sa-orang pěrěmpuan atau lain-nya. "Desire".

فايغ برم ya-itu payong pakaian raja-raja erti-nya payong ubor-ubor warna-nya kuning puteh merah. "Fringed royal umbrella, yellow, white, or red".

كواسن (kawasan) ya-itu těmpat sěmpadan atau نفواسن (pěngawasan) ya-itu těmpat dalam lengkong pěrěntahan-nya (or pěrěntah-nya, the *n*, though written, having no dot over it). "A place with delimited boundary or within the ambit of one's authority". *Kawasan* was the ordinary Ma'acca word for a "holding" of village land. It does not seem to be in Wilkinson,

but is in Winstedt's English-Malay Dictionary. (In common colloquial use. R. O. W.).

ترساري *ya-itu saperti yang terkandas atau pakaian yang tersangkut.* "Obstructed". (? Winstedt's *tersadai* P. 'aground'.)

سومگا (*sa-moga-moga* ?) *erti-nya* *běroleh kědatangan tiada di-sangka-sangka dan sěbab.* "Unexpected and without rhyme or reason", of an event that happens to one (Sanskrit *mogha*, Javanese *moga*, "in vain, useless".)

سعك (sic: read سغك ?) *erti-nya tiada yang lain hanya itu jua.*

تياد سفا *erti-nya tiada suatu pěkěrjaan atau pěkataan yang tiada بر بناران (běrbėnaran ?) jadi-lah orang tiada sėnonoh.* Apparently سفا means "the very thing" that is suitable to the circumstances. Probably Wilkinson's *sēměnggah*, "becoming proper".

چورونغ (*chorong*) *ya-itu těmbat sireh pada raja.* "Betel outfit for rajas". Wilkinson has the word but does not confine the use of this type of outfit to rajas.

جه (*jěbah*) *ya-itu těmbat sireh pada orang bėsar-bėsar mēntěri.* "Betel outfit for high dignitaries and ministers". Wilkinson, under *jěbah* II., has *anak iěbah.* "a name sometimes given to the small vessels (*pěkapor*) for *sireh*-lime kept in a *sireh*-box".

قمينغ (*pěminane*) *těmbat sireh orane kěbanvakan yang bėrnama-nama.* "Betel outfit for commoners of some distinction".

The word is, of course, formed from *pinang*, "areca-nut" (commonly called "betel-nut"), but is not in Wilkinson.

كارس *těmpat sireh pada orang baik-baik.* "Betel outfit for persons of respectable family". This word occurs in the variant version of the "Malay Annals" printed in Vol. III. Part I. of this Journal, on p. 46, where it is connected with betel-chewing, and on p. 37, where there is mention of a "*karas*" weighing two catties.

فغلاغ *erti-nya heran atau těrchěngang.* "Surprised, astonished." This would appear to be Wilkinson's *bangling*, "failing to recognize". The word occurs in the MS. itself in the following sentence, where it evidently means "startled": "*jangan ěngkau takut dan iangan ěngkau bangling mėlihat aku, mari-lah ěngkau hampir* These words were addressed by a raja who had lost his way in the jungle to a boy who had followed him from afar.

مناسي *erti-nya tiada pěrnah mēnchium bau-bauan yang sarupa itu.* "Unwonted", with reference to a perfume.

كفر يوان *erti-nya mēmakai yang chantek dēngan sa-lēngkap-nya*. "Wearing a complete set of fine garments". But obviously the word primarily means "royal" or "princely", from *pērabu* or its variant *pērbu*.

بيدغ *erti-nya harimau pada bahasa pēri*. "Tiger", in the fairy language. (The ordinary meaning of the word is "broad").

جندق *erti-nya sa-orang bēkērja di-pērhēntikan pēkērjaan-nya itu sēbab سکن (sēgan-nya?)*. Apparently this means knocking off work because one is disinclined to go on with it.

سنگکواغ *ya-itu pada nama China buah (سنگکوه) I cannot explain this and suppose the last word to be corrupt. Wilkinson has sēngkuwang, "the yam-bean".*

سکن *erti-nya sa-orang mēngērjakan pēkērjaan dēngan سکن (sēgan-nya?)*. Apparently this means "reluctant", with reference to doing one's work. It can hardly be Wilkinson's *sangkun*, "firm, steadfast", but may be a mere variant of *sēgan*.

ميمون *erti-nya mēmbuat pērjanjian atas pēkērjaan baik atau jahat masok bērsama-sama*. "To agree to enter on some joint undertaking or venture".

سلمبادا *erti-nya sa-orang pinjamkan sa-suatu bēnda ka-pada sa-orang lain*. "Lending".

تفاءوص *erti-nya mēngadap raja atau mēntēri atau orang 'alim barang sa-bagai-nya dari-pada orang mērtabat maksud-nya*

itu sapērti had (حد) ada-nya. In the Arabic dictionary I have found *tafawus* with the sense of "separation, distinction" and *hadd* means "setting bounds, defining, boundary". This would be a highly figurative way of expressing one's deferentially distant approach into the presence of a superior.

لغکوه *ya-itu orang yang mēlēbehkan pērkataan atau pakaian pikiran orang lain kurang dari-pada mērtabat-nya atau barang suatu pun ia-lah yang tērlēbeh*. Apparently an arrogantly conceited person. Perhaps this is Wilkinson's *lenggok*, "the swaying of a dancer".

ايريك *erti-nya orang yang mēnggosok-gosok kaki dēngan lain kaki*. "Rubbing one leg (or foot) against the other".

The other words in the glossary are بيري (wrongly connected with *baharu*), بریدا (wrongly interpreted "young"), سراب (for *sharab*, "drink"), kuda sēmbērani (wrongly explained as a "swift" horse), sa-mana-mana (better *sēmēna*), suam, سودود (for *sudut*,

"nook"), سفته (for *sěmpěna*, *sěmpāna*), *tawanan*, *sopan*, *santun*, فف لوك (probably formed on the analogy of *pusparagam* and *panchalagam*; it is explained as being the application of various precious substances of different colours on to some object), *panchalagam*, *sayu hati*, 'arif, *budiman*, *bangsawan* (in the sense of noble by birth), *sětiawan*, *děrmawan*, *gunawan*, *muda bēlia*, *rayu*, *dikělolaī* ("being ruled"), *sa-yujana*, *tiada bērdan* ("something that could not be done by reason of a hindrance"), سريك (sěrek), *jěra*, *jěmu*, *jěmu rana*, *chěnděra*, *pěrdu* (here, *inter alia*, a word سجاج is given as an equivalent), *gěmbol*, *těrbil*, *chěnděrong*, *rawan* (but this is explained as the sensation of vertigo in a high place), *saksama* (wrongly connected with *sama*), *bagong*, *sa-konyong-konyong* (spelt سفكوبغ *langkup*, فيريك (*perek*), *dahulu* (and *dulu*), *pěri* (and *sa-pěri*), *rupa* (and *sa-rupa*), *rakna* (better *ratna*), *gěrau*, *běnda-hari*, and *di-lěngkarai* ("governed by a raja"). Further the two following glosses فئدران *ya-itu sapěrti pandangan pada matahari* atau bulan atau pada ayer atau pada kacha tiap-tiap chahaya-nya boleh dapat tětap di-lihat, and فئرتي-nya pandangan yang tiada dapat tětap (تاتف) *mata*. Compare Wilkinson's definition of *pěndar* or *pěnar*, and his *pěndar mata*, "to see stars".

I take this opportunity to revert to the word *tamra* (in the Trengganu Inscription), which I attempted to explain in Vol. II, Part III, of this Journal on page 262. There is no doubt as to its meaning, and it is the same word as *tamběra* which occurs on p. 43 of Vol. III. Part I, where it means exactly what the French call "protocole" in relation to official and diplomatic correspondence, i.e., the proper expressions to be used, and the like. The word occurs in Khmer and Siamese, as well as in these Malay sources, in the sense of a formal document. I rather doubt the etymology I suggested for it in the first place above cited. It could very well be a Khmer formation from *tra*, "seal", which also occurs in all these three languages (Malay *těra*). As such it could have come into Malay through Siamese or direct from Khmer, for Malays had been in contact with a Khmer population in the region of Ligor for at least a century before the Siamese came down from Northern Siam and overran the Southern districts.

It was a lapse of memory on my part that I failed to connect *tamběra* with *tamra* before.

Some Malay Superstitions.

By HAJI ABDUL MAJID.

1. The loss in a dream of a tooth in the upper jaw signifies imminent death of an elderly relative, and of a tooth in the lower jaw that of a younger relative.

2. When starting on a journey the sight of a funeral is a sure sign for the traveller to see another funeral on arrival at his destination.

3. If a snake crosses the path of a traveller from left to right it is considered a good omen, but if from right to left it is a bad omen.

4. The hooting of an owl at night means to the one who hears it that he will receive news of the death of one of his relatives soon.

5. Saturdays and Tuesdays are considered bad days for cutting the finger nails or shaving the head, while Wednesdays are bad days for beginning an undertaking.

6. When the dragon is swallowing the sun or the moon, which is the interpretation of the eclipse of either of these planets, the only sound that will reach and frighten the dragon away is that made by hitting the nails of the two thumbs together.

7. The deputation sent by the parents of a young man to make preliminary enquiries (*buka chakap*, not *mëminang*) from the parents of the would-be bride, consider it a good omen if they find the maiden on their arrival at her house either bathing or carrying water or cooking or combing her hair, but it is a bad omen if they find her sleeping or sweeping the house or sitting on the doorstep.

8. Starting on a journey a man will be guided by friendly angels if the breath from his right nostril is stronger than that from his left. This is found out by breathing on to the back of the hand.

9. If one dreams of climbing up a hill one is soon to have some sort of success in life, or promotion in one's career.

10. The itching of the right eyelid signifies the arrival of or news from a long lost friend or relative; that of the left eyelid bad news, perhaps to the extent of causing one to shed tears.

11. If the palm of the right hand itches the man is to receive money, but if it is the left hand he will have cause to spend money.

12. If a woman expecting to be a mother dreams of getting a *kris* or any other similar manly possessions, she will give birth to a boy; but if it is a ring, ear-ring or any other similar womanly adornments, her child will be a girl.

13. When planting a coconut or plantain tree it is advisable to have as many children as you can get hanging on to your back (*bërdukong*) so that the tree will bear fruit in plenty (*buah-nya bërdukong-dukong*).

14. The coo-ee of a shikari or beater in a hunt should not be answered lest you attract a wild beast to you.

15. A man going out to fish with a cast-net (*měnjala*) should do so on an empty stomach, otherwise his catch will not be a big one.

16. You should not bag your quarry, whatever it may be, when any part of its body is twitching (*měngirai bulu-nya*) lest you incur the *bahadi* of the animal, that is, you will be possessed of the spirit of the animal which generally gives you rheumatism or similar ailments.

17. To make yourself immune to *pukau* (magic used by thieves to send the inmates of a house sound-sleep) place the *těmpat kapor* (receptacle for lime used with betel leaves) between the *kachip* (the scissor-like contrivance used for splitting areca nut).

18. The flight of bees westward foretells rainy weather; eastward, dry weather.

19. If your cigar or cigarette burns only on one side, you can be sure that some one present does not like you.

20. If you dream of seeing evil smelling things, it means that people have been talking evil of you.

21. If a maiden or a woman dreams of being seized by some animal, she is soon to get a husband; the bigger the animal, the higher the position of the man.

22. When fishing with rod and line, you must not walk over (*langkah*) your rod or line, lest you catch no fish at all.

23. When a man overfeeds himself and feels heavy in the stomach as a consequence (*kěnyang*), he can get relief by ladling out in imagination some of the food from his inside and giving it to his friends saying: Here! One ladle (*sa-sěndok*) for So and So; another for So and So; and so on.

24. A woman is said to be of sweet blood (*darah manis*) during the period of her first pregnancy so much so that the tiger yearning for such sweet blood can smell her even from a distance of seven hills and seven valleys. Not only the tiger but all wild beasts on land and in the water as well as the *polong* and the *pělēsit* (well known evil spirits) are said to be very fond of the *darah manis* of the woman during her first pregnancy.

25. The *langsoyor* or *langsuir*, i.e., the ghost of a woman who has died at child birth and is believed to wander about on moonlight nights and make her appearance to lonely travellers tempting them with giggles and laughter, is said to have a hole in the back of her head, which hole if filled up with her trailing hair will turn her into a human being again. But the man who manages to do that must never leave an areca nut (*pinang*) between the *kachip* lest she flies away again as a *langsoyor*.

26. The *langsoyor* and other kindred spirits do not walk this earth with their feet touching the ground, but this can only be discovered by stooping down and looking at them from between one's legs (*chêlah kangkang*).

27. The moon is the truant wife of the sun, hence their hide-and-seek game in the skies every day and night. If the moon is caught up by the sun, she runs away to the seventh strata of the sky to hide herself.

28. The visit of a butterfly to a house means the arrival of a friend shortly; if it rests on one of the inmates of the house, he or she will have the particular attention of that friend.

29. The chattering of the magpie-robin *murai*, signifies that the person who hears it will soon receive some news; whether the news is good or bad depends on the way the bird chatters: short, sharp notes are meant to convey warnings of a coming misfortune; long, wailing sounds mean news of the death of a relative; and shrill, merry tunes signify the coming of a happy event. The Malay on hearing a magpie chattering generally addresses the bird thus: "If your news is bad news, Sir Magpie, please go away; but if your news is good news you may remain there, Sir Magpie."

30. The Holy Quran says: "No person shall die one second before or one second after his appointed time." So the tiger, to respect this ruling of the Almighty Creator, always finds out whether his or her appointed time is up before he springs at and kills a human prey. This is done by looking at the person through a hole in the leaf of a species of tree with broad leaves where bark is made into cloth tree. If his time is up he will be seen without a head: otherwise his head will be visible.

31. The reason why a tiger seldom springs at a man from in front but always from behind his back is because on the forehead of every man is written that verse of the Holy Quran which declares the superiority of man to all other of God's creature.

32. When you sleep on your right side you invite the angels to sleep with you, but if you sleep on your left side you invite Satan.

33. To lie on your chest (*mênjarap*) and swing your legs in the air is to invite the Angel of Death to take away your mother.

34. When two persons during a meal simultaneously put out their hands to take food from the same dish, it signifies the arrival of a friend who will join in the meal.

35. Pulling out the hair of your beard will soon make you short-sighted.

36. A woman whose hair is not long enough to reach down below her waist makes an unlucky wife.

37. A baby sucking at the toes of its feet signifies that there is going to be another addition to the family in that its mother is already pregnant.

38. When people are taking their meals you must not leave the house until they have finished eating lest it brings bad luck on them and to you if you do so. If you are in a hurry and therefore obliged to leave the house, you must ask the principal pillar of the house (*tiang sêri*) to represent you during the meal-time in order to avoid the bad luck.

39. If you hear strange sounds at night time you must not be too ready to reply or make any remarks about them for fear they are sounds made by evil spirits who may be annoyed with you thereby and do you harm.

40. The phosphorescent lights seen at sea in the dark are the resurrected eyes of those buried in the deep.

41. To dream of seeing any white object signifies the loss of some valuable possession.

42. Catching a bird in a dream is interpreted to mean that the person the dreamer loves has transferred his or her affections to another person.

43. If a son resembles his father in features, he is sure to lose his father before he comes of age. To avoid this calamity, the son must have one of his ears pierced and use an ear-ring.

44. If a daughter resembles her mother in features, she is considered as *panas* or hot *i.e.*, unlucky for the family, that is, her parents will soon be separated either by death or by divorce.

45. It is considered lucky or "cooling" *sějok* for the family if a son resembles his mother in features, or a daughter her father.

46. The birth of a daughter after a large number of sons or a son after a large number of daughters is considered unlucky to the family.

47. If you meet a ghost you must not strike at him more than once because the first stroke will kill him, but the second or subsequent strokes will bring him back to life again.

48. If you are fortunate enough to catch hold of a ghost of the kind known as "*hantu tinggi*" (a ghost that has the appearance of a man and grows taller and taller as you keep on looking at him), you may get any supernatural powers from him for the mere asking, provided you do not ask for more than one of these "powers". But if you ask him for wealth (*kaya*), all he will do for you will be to grow *papayas* round your house.

49. Some tigers are looked upon as sacred *kramat* and will not molest nor allow other tigers to molest the people of the place they are supposed to protect unless and until some one commits an outrageous sin, say incest for example, when they will show their wrath first by killing a cat, an animal believed to be the *guru* or master of the tiger. If this warning is not heeded, then the sacred tigers

themselves will punish the people by preying on them and their live stock night and day until the guilty ones stop or are stopped in their misdeeds.

50. When you visit a sick person you must not go straight to his room for then you will be taking the evil spirits that may be following you direct to the sick bed.

51. After cooking something on the fire, you must give a little of the cooked food to the spirit of the *tungku* (the three cornered stand on which cooking pots rest on the fire), lest it gives trouble next time you cook again.

52. A woman with long and curving eyelids is fickle and never constant in her affections.

53. If the bees or wasps build their nest in any part of a house, it is a sign of goodluck for the people living in that house.

54. Never walk over a gun or a rifle for then it will refuse to kill when you shoot with it.

55. Never make remarks about the diseases or afflictions of any person lest you should be attacked likewise.

The Rules for some Common Malay Games.

Written by students at the Malay College, Kuala Kangsar and

communicated by C. BAZELL, (Headmaster).

"Pat ! Pat ! Suku Lipat;

Siapa dapat, orang itu melompat."

This game is played out of doors. Any number can take part, three being the minimum. There must also be a referee.

The children playing arrange themselves in a row, hands behind, palm upwards.

The referee has a stone and walks behind the players who are not allowed to look round. As he walks along, he repeats the refrain given above and drops the stone into a player's hand. Whoever gets the stone must jump forward to avoid being kicked or slapped by the other players.

If he escapes, he goes some 15 to 20 yards in front; if he is touched, he has to take his place in the game again and the referee begins again.

When one has escaped and is in front, the referee asks those who are left behind what they represent. They each reply according to choice (one will be a goat, another a flower and so on) but all must be different.

The referee adds one name more and then asks that boy with the stone to choose one of the names. If he selects the name added by the referee, he has to resume his place in the ranks and the game starts once more.

If, however, he chooses a name given by a player, that player has to go out and 'pick-a-back' the boy with the stone to the referee. He then takes the stone from the boy, hides it in one of his hands without the boy seeing, and then asks the boy who is carried. "In which hand is it?"

If the boy fails to guess right, he has to get down and resume his place in the game which starts again.

If he guesses correctly, the boy who carries him turns round once and the question is repeated three times. If he guesses right three times, he is carried back to his original place. If he fails, he goes back to his old place as before. And the question is repeated with the same penalty as before. The question "In which hand is it?" is put three times in all. If the boy guesses right three times, he is carried out to his place 15/20 yards in front and then back to his original place in the rank, and the game starts again.

Belaga Buah Keras.

Although this game is well-known all over the country, it would appear that the Pahang Malays alone indulge in this form of amusement to any extent. It is always to be found on special occasions amongst the rajas or at marriage ceremonies generally, and it always means a gamble.

The rules are as follows:—

1. The actual game is played by two persons, though when the stakes are made, others can assist the players in their betting.
2. The two competitors produce their fruit, one 'buah keras' each. They then toss for play. One player throws up the two nuts and it depends whether they fall face upwards or upside down. If both fall the same way, the other player tosses them.
3. When one nut falls 'face up' and the other 'face down', the nuts are placed in a special 'press' made of wood (not unlike a lemon squeezer). The nuts are placed in according to the result of the tossing: one nut at the bottom, face upwards, the other nut on top, face downwards, some sort of packing being placed in between to prevent the nuts slipping when they are compressed.
4. When the nuts are in, the press is closed and one of the players stamps on the press handle to see whether one of the nuts breaks. If he fails to break one, the other player has a try.
5. The owner of the nut that is broken loses and pays. If both are found broken, two fresh ones are substituted.

Tebar Jala (Throwing the casting net).

This game is popular with small children as it is not difficult and does not require much intelligence.

Small shells are required for the game, the number being decided by the players, all receiving the same number.

Any number can play but the usual number is four or six. They then throw dice to decide the order of the play: the person getting number 1 "casting the net" first *i.e.*, he scatters the shells first. For every one playing has to put into the pool ('taqan') as many shells as have been agreed upon.

The first player collects the shells in his hands, gives them a shaking to mix them up and then lets them fall from his hands. He picks up the shells that are face downwards and those that are face upwards are left for the next player who tosses them similarly and gathers up those that are face downwards, passing the remainder to the next player, and so on until the last shell is picked up,

beginning, if necessary, with the first player again. The one who picks up the last shell receives a fresh contribution to the pool from the other players and putting in his own contribution he starts again.

The turn for throwing always goes counter-clock-wise. The number of counters for the pool is not fixed but can be changed each time by general agreement.

The winner is the one with the greatest number of shells at the end.

Any one left without counters may borrow from another player but if the game is played with partners, the partners have to put up the pool for their man who is short.

Partners sit opposite as at cards.

The end of the game is fixed by agreement.

The exciting part of the game comes when there is only one shell left for every one hopes to be lucky enough to get it face downwards and so become entitled to the first throw with a full 'pool'.

A Naning Terumba.

By A. HYDE, B.A. (Oxon.), M.C.S.

Bahawa maka ini-lah silah-silah terumba daripada zaman purba kala asal keturunan Raja yang di-turunkan oleh Allah subhanahu-wa-taala daripada langit ia-ani dari sburga ia-itu-lah dua orang Raja, sa-orang laki-laki dan sa-orang perempuan, dan yang laki-laki bernama Sultan Zalkarnaini¹ Raja Makedonia, ia-lah yang dudok memerintah di-bumi, dan yang perempuan itu bernama Sultan Raja Maha Dewa,² maka ia-lah yang dudok memerintah di-langit keyangan.

Dan Sultan Zalkarnaini itu, apabila ia turun ka-dunia itu, maka ia pun berjumpa-lah ia sa-buah bahtera yang di-namakan di-dalam bahasa Menjapahit lanchang; maka dudok-nya lanchang itu dalam bahar kabir, ayer-nya hijau, dan di-ambil oleh Sultan Zalkarnaini lanchang itu. Maka lalu di-layarkan-nya oleh Sultan Zalkarnaini lanchang itu di-dalam lautan yang hijau, entah beberapa bulan lama-nya tiada-lah terhisabkan.

Dalam pelayaran itu maka tiba-tiba sampai-lah ka-lautan yang biru ayer-nya, maka Sultan Zalkarnaini berhenti-lah di-situ serta di-champak-lah sauh, lalu berlaboh Sultan di-laut yang biru itu. Maka lama-nya berlaboh di-situ sa-hari sa-malam, maka Sultan Zalkarnaini bersiap-lah membongkar sauh-nya hendak berjalan, maka beberapa kali di-putar-nya sauh itu tiada terbungkar, dan Sultan Zalkarnaini pun taajub-lah sa-saat memikirkan hal-nya. Maka turun-lah Sultan Zalkarnaini ka-dalam laut itu melihat sauh itu, kelihatan sauh-nya tersangkut pada sa-buah peti, lalu di-luchutkan oleh Sultan sauh itu dan peti itu di-angkat oleh Sultan di-bawa-nya ka-atas lanchang itu serta di-buka-nya peti itu, moga-moga terlihat-lah sa-orang perempuan terlalu amat baik paras-nya gilang-gemilang kilau-kilauan chahaya muka-nya saperti bulan pernama ampat-belas hari bulan di-pandang nyata. Maka Sultan Zalkarnaini hairan-lah keliru-nya memikirkan, 'Berempuan ini dari mana datang-nya si-molek ini.' Maka pada masa itu Sultan pun bertambah-tambah-lah suka-chita-nya, sebab ia beroleh baki yang demikian. Kemudian sauh pun di-bongkar lalu berlayar, entah beberapa lama-nya dalam pelayaran itu, maka Sultan pun memandang ka-kiri dan ka-kanan, maka tiba-tiba kelihatan-lah dari jauh sa-buah pulau lalu di-tujukan-nya haluan bahtera-nya itu ka-pulau itu dan apabila sampai lalu berhenti-lah di-situ. Serta ia naik-lah Sultan Zalkarnaini di-pulau itu dan peti itu pun di-bawa-nya-lah naik bersama-sama di-letakkan-nya di-pulau itu, maka Sultan Zalkarnaini pun berjalan-jalan di-pulau itu karna ia mengambil angin hendak mensehatkan badan-nya.

¹ Alexander the great.

² Mahadewi—Durga, wife of Siva!

Maka tiba-tiba terpancang pada batu itu satu tulisan arif-arif, lalu Sultan hampir-lah melihat huruf itu serta di-baca-nya: maka tersebut di-dalam tulisan itu nama pulau itu Pulau Puteri.

Maka di-situ-lah Sultan Zalkarnaini dudok, maka tiada-lah ia menentukan daripada perbilangan-nya, habis hari berganti bulan habis tahun berganti musim, maka Tuan Puteri itu pun hamil-lah dengan tiada jima' daripada Sultan Zalkarnaini. Maka sangat-lah hairan di-dalam hati Sultan memikirkan hal perempuan itu, maka lalu-lah di-namakan oleh Sultan perempuan itu Tuan Puteri Bonda Kandongan. Kemudian apabila chukup bilangan puteri itu maka ia pun beranak-lah sa-orang laki-laki lalu di-namakan oleh Sultan Zalkarnaini budak itu Maharaja Alif, jadi anak yang pertama kapada Puteri Bonda Kandongan. Kemudian daripada itu hamil-lah pula Tuan Puteri, chukup bilangan-nya Tuan Puteri itu pun beranak-lah pula lagi sa-orang laki-laki juga, lalu di-namakan oleh Sultan Zalkarnaini budak itu Maharaja Depeng ia-itu-lah anak yang kedua daripada puteri. Kemudian daripada itu hamil-lah lagi Tuan Puteri, chukup bilangan beranak-lah lagi sa-orang laki-laki, maka di-namakan oleh Sultan Zalkarnaini budak itu Maharaja 'diraja ia-itu anak yang ketiga daripada Tuan Puteri Bonda Kandongan.

Lama-keiamaan maka anak raja yang tiga-tiga beradek itu pun besar-lah. Maka sa-kali persetua Sultan Zalkarnaini pun memanggil-lah anak raja yang tiga itu mengadap ka-pada-nya serta kata-nya, " Hai anak-ku yang bertiga, sekarang kamu masing-masing sudah-lah besar dan umur pun chukup lagi pun ayahanda laratan ka-dunia memegang jawatan memerintah di-bumi ini. Di-dalam pikiran ayahanda mudah-mudahan jikalau di-izinkan Allah taala ayahanda hendak berbalek ka-shurga, maka pada waktu ini ayahanda hendak menentukan pangkat jawatan kerajaan masing-masing, supaya jangan jadi perbantahan kemudian kelak antara anakanda ketiga beradek ini." Lalu bertitah-lah Sultan ka-pada anak yang pertama baik Maharaja Alif di-hukumkan oleh Sultan Zalkarnaini memegang jawatan ia memerintah di-bandar Rum di-dalam Stambul itu hala jalan ka-sabelah matahari hidup, dan Maharaja Depeng di-hukumkan oleh Sultan dudok memerintah di-negeri China ia-itu hala jalan sa-belah matahari mati dan Maharaja 'diraja di-hukumkan oleh Sultan membawa kebesaran-nya pergi bersama-sama dengan bondanya Tuan Puteri itu turun di-Gunong Berapi di-dalam Pulau Percha. Maka di-situ lah ia dudok tempat sialang belantek besi tempat gemotong (?) membilang bongkah, tempat penyepit (?) betimba (?—bertimbal) jalan, maka ia dudok-lah situ. Kemudian dari-pada itu maka turun-lah Tuan Puteri itu dengan anak-nya ka-perenggan Padang Panjang melihat tanah di-mana yang baik akan tempat hendak membangunkan istana tempat daulat kebesaran Sultan Maharaja 'diraja bersemayam. Maka sa-telah tanah yang tersebut itu lalu bertitah-lah Maharaja 'diraja kapada segala rayat-nya, yang jauh sudah tiba yang dekat sudah datang, lalu berhimpun-lah sakalian di-da'am perenggan Padang Panjang itu. Maka Sultan

Maharaja 'diraja pun merenjiskan tepong tawar di-situ serta ia bertitah Maharaja 'diraja ka-pada isi negeri-nya, demikian bunyi-nya, " Hai kamu sakalian, akar di-tetas, kayu di-tetak, tanah di-gali; akar di-tetas buat pengikat, kayu di-tetak buat pelandas, tanah di-gali buat penimbun." Maka bertitah-lah lagi Maharaja 'diraja minta siapkan keamatan hendak membangunkan istana itu. Maka sakalian pun siap-lah itu maka sa-telah sudah siap sakalian itu, maka istana pun di-dirikan oleh Maharaja 'diraja, istana terdiri tukang pun berkerja, istana sudah tukang di-bunoh, maka lalu di-namakan istana itu, batang turus je:atang, bërtaboh pulut-pulut, berkandang sëriguri. Maka baharu-lah tetap tempat kedudukan Sultan Maharaja 'diraja.

Lepas dari-pada itu Tuanku Sultan Maharaja 'diraja pun membuat dua orang penghulu di-bawah-nya serta ia menaruh gearan-nya penghulu yang di-buat-nya itu, pertama-tama dato' Temenggong Si-gudi dan yang kedua dato Merpateh Pisang Sa-batang. Lalu Sutan Maharaja 'diraja mengeluarkan bilangan-nya, demikian bunyi-nya, " Bertuan ka-Menangkabau; beraja ka-Johor Lama, bertani ka-Siak, berpangkalan ka-Malaka, bermak ka-Naning Baw-lor(?), jumbai ka-tanah Jelebu." Maka ada perbilangan, " Rantau berturut dengan undang, negeri bertempat dengan pesaka, kampung berbunyi berkatak tangga." Maka lalu-lah raja yang di-bawah-nya menjalankan dari-pada bilangan itu. Maka ada bilangan, "Semu-jong ba:ai bertongkat, Johol balai melintang, Rembau tanah kera-jaan, Seri Menanti tanah mengandong." Maka tetap-lah perbilangan adat pesaka dari dahulu hingga sekarang, bilangan Rembau dengan Naning, tiada-lah boleh di-ubah-ubah adat pesaka yang tersebut itu dan barang siapa yang mengubah neschaya di-makan besi kawi. Wa-salam.

Translation.

This genealogy handed down from olden time, recites the origin of a Raja whom Almighty God sent from Heaven above. There were two persons of princely blood. Sultan Alexander of Macedonia held sway over the earth and Sultan Maha Dewa had her throne in the sky, the home of the Gods.

Now when Sultan Alexander descended upon earth, he espied a barque, called in the language of Majapahit a Lanchang, floating in the green waters of a mighty sea. The Sultan took possession of this Lanchang and sailed over the green ocean, and we know not how many months he took over the voyage.

All at once he came to a Blue Sea and making a halt there anchored in its dark waters for a day and a night. As he was about to continue on his journey he tried many times in vain to raise the anchor. For a space he pondered in amazement over the matter and then went down into the sea to discover what was amiss. There he perceived that the anchor was fast to a box which he loosed and bore aloft into the Lanchang; opening it, he saw, wonder to relate,

before his very eyes a woman of exceeding great beauty whose face beamed and shone like the new moon. Astonished and perplexed he asked himself whence this lovely apparition could have come, while his delight grew and grew at the thought of such a prize. At last he weighed anchor and sailed away on a long voyage. He looked to the left and he looked to the right, and suddenly he sighted an island whither he directed his course. On arrival he landed and taking the box with him set it down, while he walked in the breeze for his refreshment. All at once he espied a stone with writing of learned men upon it, and drawing near read the characters which stated that the island was named the Island of the Princess.

The Sultan stayed on without counting the days, months, years and seasons passed until the Princess conceived without having had intercourse with the Sultan who marvelled at the occurrence. For this reason the Sultan named the Princess Bonda Kandongan (Mother of Birth). In due course the Princess brought forth a son called Maharaja Alif. The Princess conceived again and in time brought forth a child called Maharaja Depeng, her second son. Again the Princess conceived and duly brought forth a child named Maharaja 'diraja.

After a long time the three Princes grew up and one day their father the Sultan Alexander called them before him and addressed them in the following terms;—

“My sons, now each of you has grown to manhood and your parent does but dawdle on the earth in his office of sovereign ruler over it. It is my resolve, if God wills, to return to heaven; therefore it is my present intention to secure a share of my empire to each of you, that there may be no fighting over the matter when I am gone.”

The Sultan then addressed his eldest son saying, “We, Sultan Alexander, do appoint you Maharaja Alif to be lord and governor of the town of Rome in Stambul towards the sun-rise; We appoint Maharaja Depeng to rule over China towards the sun-set and Maharaja 'diraja to take up his insignia and accompany his mother down to the Fiery Mountain in the island of Sumatra.”

In Sumatra Maharaja 'diraja founded his capital; it was a place where there were trees with spikes (to climb for honey), a place where shares (?) cut the clods, a place where there are (?) on each side of the paths. But the Princess went on with her son down to the confines of Padang Panjang to select a suitable site on which to raise a palace fit to house the Majesty and honour of Sultan Maharaja 'diraja. This done the Sultan called an assembly of all his subjects gathered from far and near unto Padang Panjang sprinkled rice-paste and thus addressed them:—“Learn all ye men that there are roots to be chopped, wood to be hewn and earth to be dug; make the roots into bonds, the wood into chopping-blocks and the overturned sod into mounds”.

Next the Raja enjoined the preparation of all things necessary for constructing a palace, and this they did so that the palace was finished by the Maharaja 'diraja. While the palace was building the workers toiled but when it was finished they were killed. The palace was named; its pillars were stems of nettles, it had drums of *pulut-pulut* and fences of the *seleguri* plant.

As soon as the abode of Sultan Maharaja 'diraja was completed His Highness appointed two men to be Penghulus under him; the name of the first was Dato' Temenggong Si-Gudi and that of the second Dato' Merpatch Pisang Sa-Batang.

His next act was to promulgate the following customary sayings:—"We draw our masters from Menangkabau and our Rajas from Johore; we have ancient ties with Siak and a port at Malacca. It is to Naning that we look for our mothers, and on Jelebu we depend." Then there are the sayings:—"River reaches mark an Undang's boundaries; a country provides home and entail; villages resound and have their short-runged house-ladders." These sayings the Rajas who ruled under him carried into practice. Then there was the saying: "Semujong has a hall on posts, Johol a hall athwart; Rembau is a raja's district, and Sri Menanti is the district that supports the Yamtuan."

In this wise the hereditary customary sayings were fixed without variation from those days until now. The customs of Rembau and Naning may not be changed, and he who violates them shall be devoured by magic steel. Peace be unto you. Amen.

Some Rembau Customary Sayings.

By R. O. WINSTEDT, *C.M.G., D.Litt.*

I. Tërbit undang-undang yang empat dari-pada binatang:—

- (1) Adat biawak:—
Adat biawak itu menjadi usul dengan asal.
- (2) Adat kubong:—
—kubong itu hinggap di-tengah batang.
- (3) Adat kera:—
—kera itu melonchat dari dahan satu ka-dahan lain.
- (4) Adat katak:—
—katak itu maana-nya melonchat yang baik sa-kai.
Ada pun adat biawak itu yang adu.

II. Tërbit undang-undang yang empat itu dari-pada bèneh-bènehan:—

- (1) Adat belolok. Tumboh di-rusok tiada mengikut pada beneh yang lain.
- (2) Adat berangan. Tumboh di-buntut; bawang tumboh di-buntut juga.
- (3) Adat kelapa. Tumboh di-mata. Beneh yang lain ada juga mengikut kelapa itu.
- (4) Adat limau nipis, ia-itu adat limau nipis itu masam, tiada elok.

III. Ada pun undang-undang yang empat di-pakai pada orang besar-besar:—

Ampun, adil, murah, kahar.

IV. Ada pun undang-undang yang empat:—

- (1) Di-bunoh, mati, jangan berkata-kata:
- (2) Di-tanam, dalam, jangan terbau oleh hidong:
- (3) Di-jual, jauh, jangan kedengaran oleh telinga:
- (4) Di-gantong, tinggi-tinggi, jangan sampai oleh pengait.

V. Ada pun orang tua itu empat sharat-nya:—

- (1) Orang tua dato' itu menimbangkan.
- (2) Orang tua suntok itu tiada berakal.
- (3) Orang tua kutok itu menchela-chela orang yang membuat baik.
- (4) Orang tua be'atok membenarkan atas orang yang berduit.

Translation.

- I. There are four ways of custom analogous to the ways of certain beasts: the primitive way of the monitor-lizard; the way of the lemur that hangs half-way up the tree-trunk; the way of the monkey that leaps from bough to bough; the way of the frog that is the best jumper of all. It is the way of the monitor-lizard that is just.
- II. There are four ways of custom analogous to the ways of seeds:* the way of the sugar-palm seed that unlike other seeds grows on the bough; the way of the chestnut seed that like the onion grows at the base; the way of the coconut seed that grows like some other seeds out of the eye of the nut; the way of the lime, that is sour and not good.
- III. There are four ways of custom practised by chiefs: pardon, justice, clemency, severity.
- IV. There are four ways of custom: if you slay, kill and say nothing; if you bury, bury deep that no smell may reach the nostrils; if you sell, sell afar that no ear may hear of it; if you hang, hang high beyond the reach of pole.
- V. There are four kinds of o'd men: old men who are chiefs and weigh matters; foolish o'd men who ape the young; crabbed o'd men who criticize good deeds; old woodpeckers who approve all the doings of the rich.

* An explanation of this section is given in Journ. Straits Br. R.A.S., No. 56 (1910), p. 99: it is not quite convincing.

BERSANDUL.

Verses Recited by Collectors of Honey in Rembau.

*Collected by O. T. DUSSEK.*1. **Membëri hormat kapada lëbah.**

Rundok-rundok paku di-ladang,
 Bëmban muda di-bawah batang;
 Tundok-tundok Bujang Sialang,
 Pawang muda baharu datang.
 Batang pauh dari pëmatang,
 Mari di-buat papan këmudi;
 Dari jauh pawang datang,
 Mëndëngar sahabat yang baik budi.

2. **Membëri hormat kapada kayu.**

As-salamu 'alaikum salam,
 Batang bërnama Raja Bërdiri,
 Urat bërnama Raja Bërsila,
 Dahan bërnama Sawa Mëlampai,
 Ranting bërnama Si-Ular Lidi,
 Daun bërnama Si-Layang-layang,
 Puchok bërnama Putëri Mëninjau.

3. **Mëmukul pëting.**

Mëmukul pëting bërlima-lima,
 Akan mëmukul kayu sialang;
 Pinggang ramping sa-chëkak bunga,
 Pipi halus pauh di-layang.

4. **Mëmbawa api, ia-itu tunam.**

Patong këpala-nya merah,
 Mari di-chëmok dëngan hujong lidi;
 Pawang bërgantong kapada Allah,
 Pawang bërtongkat kapada Nabi.
 Chënchang, chënchang nangkakan,
 Chënchang mari dari mënnyëlai;
 Jangan pawang barang rasakan,
 Pawang bërgantong di-rambut sa-hëlai.
 Chënchang, chënchang chëndawan,
 Chënchang mari bërsuta-suta;
 Sahaya bërpësan kapada awan,
 Rambut sa-hëlai di-bëlah tiga.

4A (Jika bulan tĕrang atau bintang banyak).

Chĕnchang chĕnchang chĕndawan,
 Chĕnchang mari di-buku buloh;
 Sahaya bĕrpĕsan kapada awan,
 Bintang jangan di-bĕri tumbuh.

5. Mĕmbakar tunam.

Nandin burong Si-Nandin,
 Nandin bĕrsarang di-hujong karang;
 Turunkan apa-lah Si-Raja Angin,
 Pawang mĕmbawa Si-Hampa Layang.
 Anak ungka tĕrdayu-dayu,
 Ia mĕnghisap bunga sĕngkuang;
 Hitam manis bukakan baju,
 Hĕndak mĕnengok panau bĕrturang.

6. Mĕmotong sarang.

Kain kĕchil panjang sĕmbilan,
 Chukup sa-puloh dĕngan rambu-nya;
 Bujang kĕchil tidor bĕrtilam,
 Tinggal pĕloh dĕngan bau-nya.

7. Mĕngulorkan sarang turun ka-tanah.

Ayun tajak buaikan tajak,
 Tajak datang dari Jawa;
 Ayun anak buaikan anak,
 Anak bĕrtimbang dĕngan nyawa.
 Bunga sĕna kĕmbang sa-jĕmput,
 Siapa chakap akan mĕngarang-nya?
 Tuan punya datang mĕnjĕmput,
 Siapa chakap akan mĕlarang-nya?

8. Pawang turun.

Kĕdudok di-balek rumah,
 Urat-nya hingga mĕlantas tiang;
 Dudok-lah yang ĕmpunya rumah,
 Pawang bĕrmohon bĕrjalan pulang.
 Hĕndak dulang di-bĕri dulang,
 Dulang bĕrisi sarong badek;
 Pawang bĕrmohon bĕrjalan pulang,
 Ada-lah musim pawang bĕrbalek.

An Incident in the History of Malacca under Portuguese Rule.

Communicated by B. S. MEE.

Taken from the Life of Dom John de Castro, born 27th February, 1500, in Lisbon, second son to Dom Alvaro de Castro, Governour of the House of Civil, died 8th June, 1548.

"The Life of Dom John de Castro, the Fourth Vice-Roy of India", was written in Portuguese by Jacinto Freire de Andrada, and translated by Sir Peter Wyche, Kt., into English.

Permission given at Whitehall, August 12th, 1663 "Let this Translation be Printed. Henry Bennet."

Printed, "London, for Henry Herringman, and are to be sold at his shop at the sign of the Anchor on the lower walk in the New Exchange. 1664".

The Fourth Book. There were but few Kingdoms in the East, which in the Government of Dom John de Castro did not alarme that State, by diverse rumours of Warr, by either Arms against us, or against one the other. inviting our Forces to make Peace, or forward the Victory; the East also saw him often girt his sword for the cause of Religion.

Diverse Kings conspire against Malaca.—Malaca at that time enjoyed a most profound Peace, settled by the friendship and commerce of the neighbouring Princes; yet the King of Viantata finding he had force enough to set upon any great design, was by strength, and ease put in mind of many forgotten grievances, which his predecessors had received from the Kings of Patana and having good correspondence with the Princes of Queda, Pam. and other borderers, found a way to bring 'em into a league making them take their parts in revenging an others Injuries; they put to sea a great Fleet, and by Capitulations agreed, that the King of Viantata should be satisfied in being revenged on his Enemy, and they go away with the Booty of the Warr for Venturing their lives in an others quarrel.

How the Commander behaves himself.—In this Conjunction, Simaon de Mello was Commander of Malaca, and on knowledge of the Breach betwixt those Princes, writ to Diogo Soarez de Mello, who was in the haven of Patane, to come to that Fortress, for all those Kings being friends to the State, he had rather arbitrate than side in their differences; besides it was in policy, reason to let 'em be broke by a Warr, that being drained, they might live with more Subjection under the peace and obedience of our Arms, considering time might furnish 'em with an opportunity, and their strength with Courage, our Dominion over them being a sufficient cause for them to hate us, and for a Warr, a strong Army look't for no other pretensions.

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Diogo Soarez not refusing the advice dispatch't some Ships Laden for China and parted himself with two little Galleys for Malaca. The King of Achem was at this time with twenty great vessels looking out for Prizes, with the force of a Prince playing the part of a Pirat; He took some Junks of Provisions, and at sea behaved himself insolently to some ships of his Friends, his success heightened his confidence, Landing by Night in the Port of Malaca, only to say he had set footing on ground that Liv'd under our obedience, and with this glory wonn solely by stealth, he immediately returned on Board.

The City was in an Uproar, and the fear and night encreas'd the danger, many flying from their own shadows, the crys of the fearful only reach'd the Fortress, for they were surpris'd with fear without danger. The Commander in Chief sent out Dom Francisco d'Esa with some Souldiers, who going into the Colony of the Chelins, saw in every ones fear and confusion the face of a Warr without an Enemy, who was by this time on Board, carrying with him only the imaginary vanity of having Landed; Simaon de Mello was as sensible of the King of Achem's Cowardice as if it had been an outrage; so sacred were the walls of that Fortress, as if to march towards them had been an insolence, to look on them a Crime; He presently set forth a light vessel to find out the King of Achem's Course, whilst he put to sea two great Carvels and six Flyboats to find out Enemy. Diogo Soarez de Mello with the two Galleys we spake of came at this time into the Haven, as if steer'd by our Fortune to help the Victory.

The Fleet goes out to find the King of Achem.—Dom Francisco d'Esa was nam'd Commander of the Squadron, who, though ill fitted out, like one who hastens to a suddain quarrel, put to Sea, with instructions, that if in ten days he saw not the Enemy, he should return to Port, not having Provisions for longer time.

They sailed eight days without sight of the Armada, and arriving at an Island had news the Enemy was come to an anchor at Queda, a Voyage of two days.

The Commander hears news of him and resolves to follow him.—Dom Francisco resolv'd to proceed, but the Souldiers mutiny'd, alledging, 'twas like a raw Commander to chase a flying Enemy; that their provisions were a'ready spent; that they came not to fight with famine: that if by the Governours orders they were limited to ten days, their obedience would be better then the Victory; yet Diogo Soarez de Mello, though inferior in Command, higher in authority, said, What Captain soever tack't about, he would set upon him first, for he should do the King better Service in sinking disobedient Souldiers then valiant Enemies. One fear thus laid with another, they set sail for Queda, where they heard the enemy was in Port eight Leagues off, Dom Francisco resolv'd, having him so near, to pursue; here was the Souldiers murmuring greater then before

though less insolent, seeing the hazard of their fear outgo that of their danger, so as they follow'd the Admiral with greater signs of satisfaction then ever, either to gild over their former apprehensions, or their souls, presaging the Victory, created more honourable affections.

They see, and set on the Enemy.—That evening they saw the City Parlez, where the enemy was at anchor, in a Bay formed by the River, at a little distance from the City. The Commander of the Squadron made some of his sound the River, and with boughs laid out the channel, to avoid the Shelves, and knowing by the soundings there was water enough for the Carvels, lay in, as the Enemy with two Galleys, and other Ships was coming to find out our Fleet; for he was told by his spies, who from the Shore had only seen the great Carvels, (the Fly-boats and Galleys being covered by the shelter of a crooked winding Point made there by the River) there were none but Merchant men. The Enemy had sent before two Galleys, which were convoys to a Fleet of Fly-boats, and finding those Souldiers then imagin'd Merchants, strove to tack about, but the River being narrow and they coming before the Wind, could not do it, before we first came up with 'em; being in a little time come to Grapling, the Arms and River were dy'd in Blood. Diogo Soarez with fifty Souldiers Boarded the Admiral Galley, and found in the Moors such resolute resistance, as all Dy'd, not one yielded, the rest fought with as brave resolution. The Victory was known by the Vessels, not by the prisoners, it seem'd by so honourable obstinacy that none would outlive his freedom; the enemies resistance was the proof of our mens courage, who fought not only with men Valiant, but Desperate.

The King of Viantata, and most of the Confederates had in the meantime receiv'd so good satisfaction from the King of Patane, as a peace was ty'd with stronger knots, and knowing our Fleet had gone to sea by that, concluding the Fortress was left without sufficient garrison, they designed to try if that occasion would make their way to free Malaca of so troublesome a neighbour, and made bold by their hating us, and Cowardly by their fear, they design'd in the semblance of Peace, to disguise a Warr; they sent an experienc'd Commander to Simaon de Mello, to condole with him for the King of Achem's destroying our Fleet, and advise him that on the joy of the Victory he was joyning more force to come upon the Fortress, that he having so few defendants, courage must necessarily yield to multitudes, since numbers and opportunities give Victories; that as friends to the State, they desired leave to land at that Port, and with their lives redeem the Fortress from so inevitable Ruine, that the World might see they were better friends in exigencies, then prosperity; besides so Cautious a message, the Envoy had instructions to observe what Souldiers were in the Fortress, and find out by the Governours countenance what Courage or Fear he betrayed

at the news of the loss of his Fleet; the Heart being a more faithful interpreter of the affections than the Tongue.

The Governour of Malaca's answer.—Simaon de Mello perceiving the offer Treachery, and the Messenger a spy, resolved to beat 'em at their own Weapon, making use of Stratagem against Stratagem; He gave them thanks for their offer of so seasonable succours, and in return of so great friendship, Challeng'd from them the usual gifts for good news, for just then he had received fresh advice of the Victory his Fleet had obtained against the King of Achem; and that he had in the Fortress men and Ammunition to spare, for their service against their Enemies; that the King of Achem went flying out of that Port, that in the persute the Portuguese had some difficulty, none in the Victory. These words were credited by the security of the delivery, and the Moor being dismiss, Credulous and Discontented at the Governours resolution, and the Victory of the Fleet, reported to those who sent him, that the Governour either understood the design, or was above the apprehension.

News wants from the Fleet.—Simaon de Mello as things stood was not a little Disquieted, for the stay of the Fleet made the News possible, and accused himself for being rash and inconsiderate, to engage the strength of that place against an Enemy, whose peace brought us no profit, or Ruine glory; for having overcome him when we were Inferiour in force, 'twould be but a small proof of our Valour to worst him when equal; thus discourst the Governour as if without a fault there could be no miscarriage; there were gone on the Fleet the Inhabitants of Malaca, whose wives and children with untimely tears bewailed the Victory they knew not of.

The people complain. Franciscus Xaverius quells 'em.

The people complained of the Governour, who with other mens lives acquir'd glory; when an honourable peace was more suitable to the States exigencies, then an unprofitable Victory; the popular Tumult had grown to Libertinism. If Franciscus Xaverius (whom India then honour'd as a Penitent, the World now reverenceth as a Saint) had not bridled the people by Preaching to them patience in adversity, not only as a virtue, but Remedy, cautiously but compassionately encouraging 'em, with the hopes of better News, which then look't more like a Friends comforting, then a Prophets prognosticks; when on the day of the fight, as he was preaching the ways of Life in the presence of a great Multitude, he was suddainly wrapt into a profound Extasis, as taking in the Heavenly secrets in a soft silence, till waking from the Mysterious intermission of his senses, His pleasant Voice burst forth, in Commanding us prostrate before the Altars, to give thanks to the Author of Victories, for at that time had God with our Arms destroy'd the Enemies Fleet; the people out of reverence to the divine interpreters fore-sight, with

gratefull and pious tears prais'd God in his Saint, from the extreams of grief beginning a more secure content. That very evening as he was in a Chappel instructing the people, he so particularly related the passages of the Battail, as if acquainted with the success from the Author of the Victory; we believe the glorious Saint was the Intercessour, and Oracle of this happiness whose presaging soul had by diverse other divine revelations, a foresight into hidden secrets. Malaca afterward enjoy'd an honourable peace, secured by the Victory we have related; but the Governour in Goa with his Arms reaking in the blood of one Battail, was summon'd to an other.

Mt. Kina Balu.

(A Dusun legend of its name).

By C. F. SKINNER.

The Putatan Dusuns hold with the following legend touching the origin of "Kina Balu",—the name of Borneo's most lofty mountain (13,455 ft.),—and that of their own descent.

The story was told to me by a native of Putatan many years ago.

(Originally told by Mentri Babu.)¹

"Long long ago, ages and ages before any white man ever set foot in this country, the great rivers of Borneo were much bigger and deeper than they now are. Now in those days one of these mighty rivers had its beginning in a water-fall down the sides of a very lofty mountain; thence it soon became a huge raging torrent swirling past wide pebble and boulder strewn *karangan* (beaches), until at one point it opened out into a large *danau* (lake), and then swept on through miles upon miles of virgin jungle down to the sea.

"At this time there lived all round the slopes of this mountain and along the banks of this river a powerful tribe called Muruts who were head-hunters. The mountain was held sacred by these people who believed (even as we do to-day) that on its lofty summit dwelt the spirits of the departed.

"Toiling up this river all the way from the sea in their huge, ugly, unwieldy-looking junks used to come Chinese traders. They brought brassware and jars which they traded with the Muruts for camphor, spices, and rhino horn. And when they had filled up their ships they would sail away back to China.

"Once upon a time there came a very much larger and finer-looking junk than any that had in the past visited this river. The owner was a Prince of China, an outlaw from his country, and with him came a mighty host of sailors and fighting men. Sailing past the *danau* he ascended the river nearly to its source. Here he landed and camped for a whole year amongst the Muruts, trading with them and gradually filling up his giant ship with much spices and other treasures of the jungle.

"At last the day came for him to depart, and he made ready with his rich freight to sail away down the winding river, out into the sea, and back to China.

"But no sooner had the Prince cast off from the bank with all his crew, than there arose a terrific shaking of the earth followed by a storm with blinding lightning and deafening thunder. The rain

¹ Paramount Chief of the Putatan district,

came down in sheets and the wind blew a hurricane, the like of which was never known before. This caused the river immediately to rise into a roaring flood, carrying with it in headlong course huge trees and logs that jostled each other in the dancing waves, or dashed themselves to pieces against the granite rocks.

"Night came on, and the wind and rain and lightning still increased. In the darkness the Prince's barge, being difficult to handle owing to its bulk, could neither turn back nor make the bank; and thus, being left to the mercy of the current could only drift and in the end was wrecked, long before it could gain the deeper waters and safe anchorage of the *danau*. The huge sea-going junk was badly holed on a rock and disappeared in a whirlpool; all the cargo was lost, and the crew and soldiers, who tried vainly to save themselves by swimming, were either killed by falling rocks from the bank, or swept away and drowned.

* * * * *

"So for three days the storm raged—and then at length the flood subsided as suddenly as it had risen. And when morning dawned of the fourth day a party of Muruts, returning from a head-hunting raid in another district, came upon the body of a half-naked man lying unconscious by the bank of the river, on the top of a huge smooth boulder. They took him to their village and nursed him back to life. This man turned out to be the Prince who by some miraculous means had escaped from his sinking ship.

"And when the Prince had come to, he awoke as out of a dream. For lo and behold! The river had now dwindled in size to that of an ordinary stream! Where now was the broad bosom of its crystal clear waters, upon which only twelve moons ago he had so majestically sailed to the foot of the mountain? Where too were its white and wrathful waves which only a few short hours back had so mercilessly swallowed up his royal junk and all his countrymen?

"Even now his Murut rescuers were telling each other in awed whispers of a strange happening: the *danau* no longer existed, but in its place only a sea of mud through which the now diminutive river meandered! Such then had been the ruthless havoc wrought by the earthquake!

"Now great was the fear that took hold of the people and quickly spread through the villages. Some of the Murut Headmen were for putting the Prince to death, and taking his head as a votive offering to the Evil Spirits. "For", said they, "this catastrophe must be due to the presence of this stranger among us". But others held that the Prince must surely be a god. For, who otherwise could have lived through such a storm, and for what other mortal would their mighty rivers have shrivelled up,—cringing as it were for pardon? Surely it would be well to keep this man among

them and treat him as one of themselves. But should they take his head as was their custom, might not the mountain be offended, and cause the river again to flood even worse than before, so that next time even their own villages on its banks would be destroyed?

"Thus it came to pass that the Chinese Prince settled among the Muruts and inter-married with them. He took to himself two wives and had many children. Years passed by, but nobody from China ever came to seek for him, as no junk or even boat could any longer navigate the now shallow river as far as this.

* * * * *

"And in the fulness of time, when the Prince's first wife died the Muruts buried her at the foot of their sacred mountain which over-shadows the village; and when the second wife died she likewise was buried beside the first.

"And because the two deceased wives had been the first Murut women to be given in marriage to this stranger—a prince of China (Kina) their graves were ever afterwards spoken of as those of "*the widows of the Chinese (prince)*" [or KINA (punya) BALU—lit: Kina (Malay)—Chinese, punya (Malay)—of the (possessive), Balu (Murut)—Widow].

"Thus, from this resting place of the *Kina balu* (The Chinese' widows²) on its slopes, has the sacred mountain taken its name KINA BALU, and her lofty peaks for ever keep watch and ward over the souls of the departed."

* * * * *

"But the Prince lived on to a very ripe old age, and became a kind of Raja among the Muruts. And he took other wives and had many more children.

"And from the children of this Chinese Prince and his Murut wives, we Dusuns believe, is sprung the Dusun race³."

* * * * *

As a matter of interest to those who know the Ranau (Interior) district, the lake or *danau* referred to in the legend, might almost be the Ranau plain (*ranau* being the Dusun for *flat*): encircled as it is by a wall of hills the plain might easily at one time have been the bed of a lake. The river mentioned suggests the Labuk. Its source comes off Kina Balu, and from there the stream flows through the Ranau plain as the Liwagu or Luagu; farther on still and as far as Tampias it changes its name to Kuanan, and thence to the sea it is known as the Labuk.

² the 'punya' has become suppressed.

³ A wide area of country surrounding Kina Balu is occupied by Dusuns. Muruts are not now found anywhere near the mountain. C.B.K.

Some Discoveries on the Tembeling.

By W. LINEHAN.

(with plates XXXVI—XLIII, one sketch map and one text-figure).

During a recent visit to the mukims bordering on the river Tembeling I came upon some very interesting traces of the pre-Malay inhabitants of Pahang which I describe here.

A small sketch map showing the scenes of the finds accompanies this paper. The discoveries were made chiefly at Jeram Kwi, Kuala Nyong, Teluk Lubok Puai, and Bukit Jong.

In no case did time permit of a thorough investigation hence the fragmentary nature of my notes on the subject. The finds were in many cases consequent on the great floods of 1926—1927 which tore away huge masses of earth from the banks of the Tembeling and laid bare the objects here described.

My thanks are due to Mr. J. C. Shenton of the Geological Department, Federated Malay States, for identifying the iron slag found at Jeram Kwi and Kuala Nyong, specimens of the iron implements found at Teluk Lubok Puai and Bukit Jong, and the bronze objects discovered at the latter place.

Jeram Kwi

Jeram Kwi is situated on the Tembeling about 60 miles from its mouth and about two miles above Kuala Sat. The origin of the name is narrated in the Malay Annals. The Malays from Malacca had invaded Pahang about the middle of the 15th century. They defeated the Siamese Viceroy of that country, Maharajah Dewa Sura, captured his daughter and pursued him up the Pahang and the Tembeling rivers.

The Annals go on to describe his flight:—

" Maharaja Dewa Sura fled in a boat and was poled (upstream). When he reached certain rapids he thought that the men of Ma'acca were not likely to follow him so far. He accordingly said to his boat-men 'Kwi, Kwi,' which means 'Slowly, Slowly.' Now to this day those rapids are called 'Jeram Kwi.' But the Malacca folk followed so quickly that Maharaja Dewa Sura had not time to escape by boat. He jumped into the stream and ran ashore, and stayed for three days and three nights in the jungle without food or drink ".

While my boats were being hauled over the rapids, having in mind the historical associations of the place, I searched for possible relics of the past. Embedded in the right bank in a line with the central point of the rapids about five feet below the top of the bank I found a portion of what seems to be a clay crucible (Plate xxxvi



fig. 2) and small quantities of iron slag. A further search revealed the following objects which were found within a radius of about fifty yards from this spot: a clay mould of the breech part of a cannon (Plates xxxvi and xxxvii fig. 1), a portion of the mould of a gun of larger calibre (Plate xxxvii fig. 2), four more portions of gun-moulds (?) two of which are shown on Plate xxxvii (figs. 3 and 4), a part of another clay crucible of the same type as that shown in Plate xxxvi (Fig. 2), a part of a vessel of thick clay the capacity of which is small in comparison with its size, fluted out-side (Plate xxxvi fig. 3) possibly also a crucible, a solid clay oblong object which may have been a mould of some sort (Plate xxxvi fig. 4), a tubular object of clay with spiral markings on the outside hollowed out for portion of its length (Plate xxxvi fig. 5) possibly a mould for a powder tube, two smaller tubular objects of coarse gritty clay (now unfortunately lost) which appeared to have been subjected to intense heat, the base of an earthenware basin with simple decoration, a fragment of the rim of apparently the same vessel, the base of what appears to have been an earthen platter, a fragment of the rim of a large earthen pan, part of an earthen jar, part of an unfinished earthen mould (?), fragments of pottery with slip decoration of the type described in Mr. I. H. N. Evans' paper "On a Find of Stone Implements Associated with Pottery" published in the *Journal of the F.M.S. Museums* (xii, 1928, pp. 133—5). Other finds included four stone implements of axe-head shape two of which are composed of powdery stone. Quantities of iron slag were strewn about the place. On the "strand" of the river a short distance below the rapids were stones in large quantities covered with fire-burnt clay. These may have formed the floor of a primitive furnace.¹

The mould of the breech part of a cannon shown on Plates xxxvi and xxxvii (fig. 1) is about 19.9 cms. long, the diameter and thickness of the barrel-part being 7 cms. and 1.3 cms. respectively. It has a triangular flange surrounding the vent. It is apparently whole except for minor breakages in the flange. Cord markings are visible on its rear-end.

The date of the invention of cannon and their country of origin is uncertain. Some writers credit the Chinese or Arabs with the discovery. Cannon were known in Europe early in the 14th century. One of the earliest types of gun used in England was a muzzle

¹ A more unlikely conjecture is that such stones were the remains of the base or foundations of the wall of a fort. This would explain the reference in the *Malay Annals* to the firing of the foundations of a fort erected to repel an invasion of Pahang by the Siamese about 1500 A.D. The foundations and lower part of the walls were made of stones coated with clay which after construction, were fired from both sides so that the burnt clay formed a cement binding the stones together.

loader with a vent-channel at the breech end. In 1338 there existed breech-loading guns of both wrought iron and brass provided with one or more movable chambers to facilitate loading. The most primitive guns generally fired stone shot. Iron projectiles seem to have been first used in Europe in the 16th century.

The *cire perdue* method of casting guns seems to have been employed at Jeram Kwi. The gun was first modelled in clay rather smaller in its dimensions than the future gun. Over this a layer of wax was laid of the desired thickness and worked to the required form and finish. A mixture of pounded brick clay and ashes was then ground finely in water to the consistence of cream and successive coats of this mixture were then applied till a second envelope was formed all over the wax fitting closely into every line and depression of the modelling. Soft clay was then carefully laid on to strengthen the mould in considerable thickness till the whole appeared like a shapeless mass of clay round which fastenings were placed to hold it all together. The whole was then dried in the sun and placed in a hot furnace which baked the clay both of the core (or inside mould) and the outside mould and melted the wax which was allowed to run out from small holes made for the purpose. Thus a hollow was left corresponding to the thickness of the wax between the inner and outer moulds, the relative positions of which were preserved by small metal rods which had previously been driven through from the outer to the inner mould. The mould was now ready and the melted metal was poured in till the whole space between the core and the outer mould was full. After slowly cooling the outer mould was broken away from outside the gun and the inner core broken up and raked out through the bore of the gun. The projecting metal rods were cut away and the whole finished by rubbing down and polishing over any roughness or defective places. If this method of casting were followed here we must assume that the moulds shown on Plate xxxvi (fig. 1) and Plate xxxvii (figs. 1 and 2) were unused. If they had been used they would necessarily have been broken on completion of the cast. Guns cast in this way must have been extraordinarily weak and ineffective, and must have exercised more moral than material effect on the enemy. It is interesting to note that the people of Trengganu to the present day follow the *cire perdue* method of casting and produce toy cannon in this way.¹ It is not at all improbable that the craft of metal-working in Trengganu has been handed down by the same race whose traces are found at Jeram Kwi.

The finds described here indicate that in the past there was a settlement at or near Jeram Kwi where iron smelting and the manufacture of cannon was carried on. The acquaintance with the

¹ Vide the article on "Tembaga Puteh and Tembaga Merah" in the journal of the Malayan Agri-Horticultural Association for May, 1928.

name of the place displayed by the writer of the Malay Annals would seem to show that Jeram Kwi was in the past of some importance. The association of the place with the "Siamese" as shown in the Annals, and the tradition still prevalent that Bukit Kepayang which is situated, I understand, about a mile away from Jeram Kwi was once a "Siamese" settlement would go to indicate that the people who smelted iron and made guns there were "Siamese", that is to say one of the races which inhabited what is now known as Siam. It is suggested that the dates between which this settlement flourished were the 14th century¹ and about the middle of the 15th century when the people from the north were expelled by the Malaccan Malays.

From a strategical point of view Jeram Kwi would have been an admirable place to establish a settlement. Enemy forces moving up or down the river could not pass the rapids unless they disembarked and could secure possession of the banks.

Near Jeram Kwi is a place (which I had not time to visit) where, according to tradition, the traces of the fishing net of the fabled Toh Ala Inang "the Head Woman" are still to be seen on a rock. The story goes that after getting a haul of fish in her net she destroyed it so that nobody else could use it. This may be a garbled version of the story of the old woman who harboured Maharaja Dewa Sura near Jeram Kwi. I record the tradition as it is possible that something of archaeological interest may be found at the spot.

Kuala Nyong.

Kuala Nyong is situated about 28 miles from the mouth of the Tembeling and a few miles from Kuala Tahan. It is the scene of the discoveries which form the subject of Mr. Evans' papers "On a Find of Stone Implements Associated with Pottery" and "Further notes on Stone Implements Associated with Pottery" published in Volume xii of the Journal of the F.M.S. Museums (pp. 133—5, 143—4). The discoveries were made in a broad passage furrowed by the flood of 1926—27 through a *tanjong* or promontory of the river.

Of the four stone implements found by me here two are of ordinary type. The other two are of a kind I have not seen before. That shown on Plate xxxviii (fig. 8) is a flint of a reddish-brown colour, highly polished, too thin perhaps to have been used as an axe-head. It was found in close proximity to iron oxide and may

¹ It is recorded that Pahang was under the rule of Palembang in the 14th century. The "Siamese" were the dominant people there in the 15th century.

² For the meaning of *inong* (variant *inang*?) vide Hurgronje's "The Achehnese" (English translation) Vol. I p. 265.

have been coloured thereby. The implement shown in Plate xxxix (figs. 1 and 3) is a hard brownish-grey stone. One of the fastenings binding the stone to its handle has left its impression all around. The notch at the haft end may have been used for the accommodation of a fastening to relieve the pressure on the handle when a blow was delivered. There is a small fracture at the central point of the free end of the stone possibly caused by usage. Otherwise the surface of the stone seems natural. Bronze and iron implements in their earlier stages sometimes tended to follow the older stone implements in shape. A comparison between this implement and the iron tool shown on the same plate (figs. 2 and 4) which was discovered at *Tambak Siam*, Pekan District, illustrates this point.

But the most interesting discovery at Kuala Nyong was that of large quantities of iron slag from smelting operations which were found by the side of one of the small pools with which the place was dotted. This spot was probably under water on the occasion of previous investigations there. As we had no digging tools with us and time did not permit, the extent of the layers of slag was not ascertained. In conjunction with the metal were found some blocks of iron ore, probably haematite, and some pieces of partially smelted ore. No bronze objects have been discovered at Kuala Nyong. As it is possible that the scene of the finds at Kuala Nyong may become the new bed of the river in the course of the next rainy season the prosecution of further investigations there is a matter of some urgency.

Teluk Lubok Puai.

The objects found at this place, which is situated about 13 miles up the Tembeling were discovered by Haji Wan Musa of Jong Berlaboh shortly after the big flood. Haji Wan Musa informed me that the stone and the iron specimens were got on the rocks on the left bank of the Tembeling, at Teluk Lubok Puai and the bronze bowl and "urn lid" in the waters of the river at Batu Pasir Garam a short distance below that place. I did not inspect the scene of the finds.

The iron tools found were eight in number two of which are shown on Plate xl (figs. 1 and 5). One (Plate xl fig. 1) is flat, thin and sharpened at one end. It is about 24.7 cms. long. Another (Plate xl fig. 5) has a length of about 37 cms. One end is hammered out to a sharp edge. At the other end is a socket. Judging by the smallness of the socket and the distribution of the weight of the implement it would seem as if the handle did not end with the socket but ran through it and the tool were worked by a two-handed grip one on each side of the socket. Two implements of the same type have been discovered at Klang, and at Sengat near Ipoh.¹

¹ Vide Evans "Slab Built Graves in Perak" *Journal of the F.M.S. Museums*, Vol. xii, 1928, pp. 111—119.

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Through the kindness of Che' Mahmud M.C.S., Assistant District Officer, Kuantan into whose possession they had come, I was enabled to add two other iron implements from the same hoard to my collection. One of these is shaped rather like a falchion, sharpened on the inner side of the curve and blunt on the outside. It is hafted and socket-less, and has a length of 17.9 cms. It is similar to an implement discovered by me at Bukit Jong, Plate xl fig. 2) and, (except for the absence of a socket) to two implements found in ancient graves at Sungkai and Sengat, Perak.² The other implement obtained from Che' Mahmud is a socketed tool 23 cms. long with flattened triangular shaped head and broad cutting edge.

I have seen an iron implement from this hoard which was presented to His Excellency Sir Hugh Clifford. I recollect that it was a tool resembling the triangular-headed tool which I have just described. Haji Wan Musa informs me that two similar implements, together with a tool resembling those figured as 3, 4 and 8 on Plate xl, from the same hoard are in the possession of His Highness the Sultan of Pahang.

The stone celts found at Teluk Lubok Puai are of the ordinary type. One is shown on Plate xxxviii (fig. 1) as being an unusually good specimen. It is a meteorite, 24 cms. in length and is worn thin from usage as a sharpening stone.

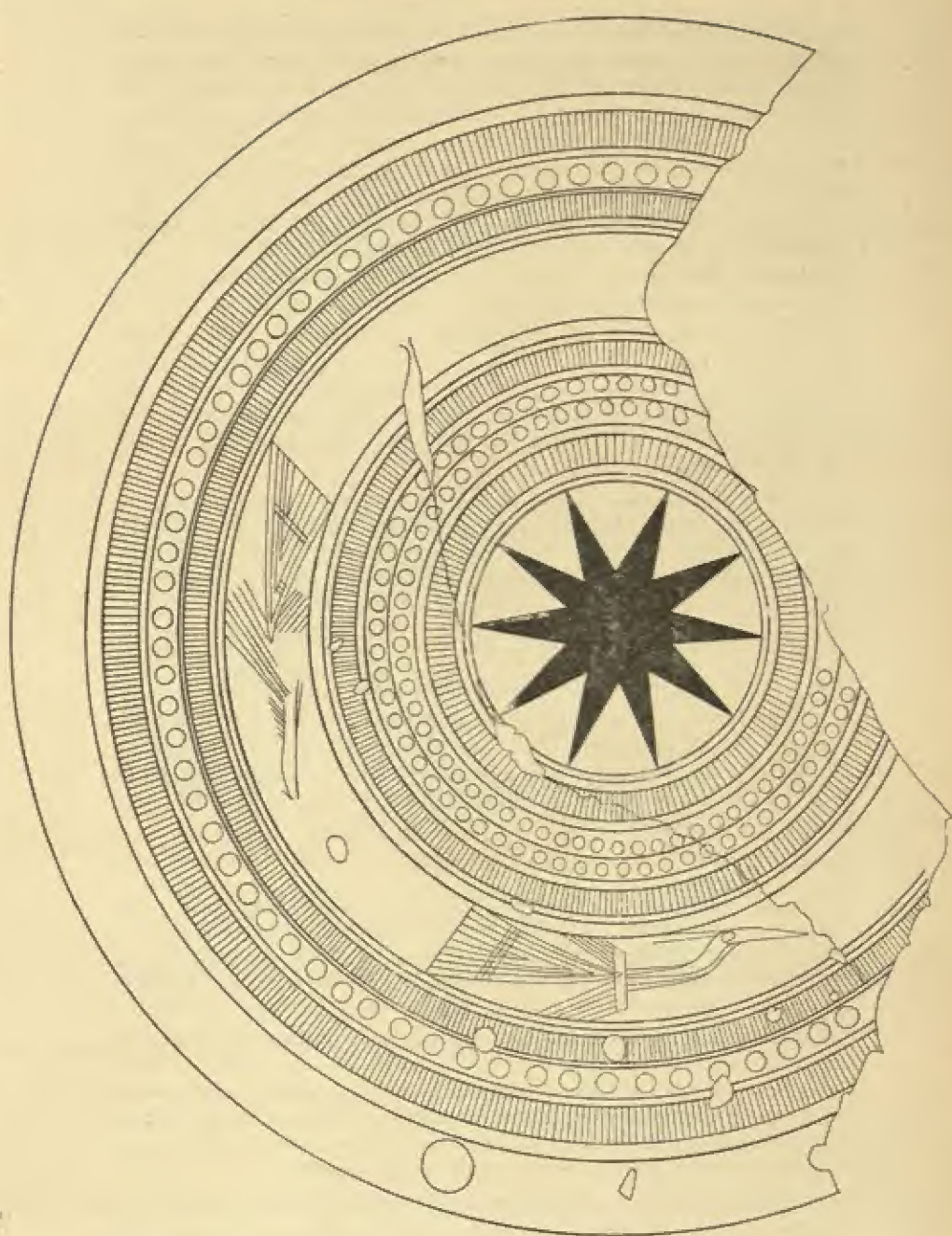
The most interesting relics discovered at Telok Lubok Puai are two moulds of stone for the casting of leaf-shaped bronze or iron spear heads (Plate xli). These are of the type known as open moulds which in Europe, have been found in association with Bronze Age settlements. They are 27 and 30 cms. in length. The shape in one (fig. 1 and 3) is deeper and more symmetrical than that in the other (fig. 2 and 4). One side of the former seems to have been used as a sharpening stone possibly for finishing off the weapon after casting. These moulds are, I think, the first of their kind found in Malaya.

Near the stone moulds was found an object resembling a finger-ring (Plate xlii, fig. 2). The black stone of which it is composed is similar to that of the bracelet discovered at Bukit Jong. It is not of uniform thickness. It may be (what it looks like) a finger-ring (though too small for an adult), or a talisman, or perhaps a primitive form of currency.

The bronze bowl reproduced on Plate xxxviii fig. 1 is of thin highly finished metal. It is without decoration except that faint ring markings are visible on its exterior. The diameter of the mouth of the bowl is 14 cms. Its base is missing.

Perhaps the most interesting of the finds on the Tembeling is the bronze "lid" (text figure 1) which came into my possession through the kind offices of Che' Mahmud. It was found in close

² *ibid.*



TEXT-FIGURE 1.

Bronze "urn lid" found near Teluk Lubok Puai.

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proximity to the bronze bowl which I have just described. It is a circular object 69 cms. in diameter, with a part missing. It is perforated in nine places possibly owing to defects in its casting. The face of the "lid" is decorated with representations of a ten-pointed sun (?), concentric circles, numerous small circles, linear ornamentation, and the figures of two crested long-beaked (?) long tailed birds with wings out-spread in flight, possibly meant to represent pea-cocks. The original decoration was obtained from a mould and stands out. On the outer part of the "lid" where a clear impress was not obtained, the design of the original ornamentation is copied in roughly incised work. The representation on the face may have some symbolical significance. At the back of the object are the remains of a rim of thin metal running around the edge. Between rim and edge is a rest to support the "lid" on the receptacle, which it was designed to cover. The back is plain. The boss is of thicker metal than the other parts which, except for the rim, are of uniform thickness. (Pl. xlii).

The elaborateness of the object, its size and composition go to indicate that it was not the cover of a vessel designed for domestic or other common purposes for which earthen-ware utensils were more suitable and more readily available. I suggest that it formed the lid of a bronze urn used as a receptacle for the body of a chief after his death and before cremation. The practice of thus disposing of the dead body of a prince or noble of high degree before it was burnt is still in force amongst the modern Siamese.¹

Near the "lid" and bowl just described was found a brownish-coloured stone implement (Plate xliii fig. 3) on the worn cutting-edge of which are faint traces of red (iron oxide?). Like the stone implements found at Kuala Nyong (which it somewhat resembles) it may have been a metal-worker's tool.

Bukit Jong.

Bukit Jong lies about a mile below Teluk Lubok Pua. The stone bracelet shown on Plate xxxviii (fig. 11) was found by a boy from the neighbouring village on the top of the steep rocky left bank of the Tembeling, half embedded in the soil, a few days before my visit. The bracelet is made of black stone with rounded exterior. In its inner circumference it has shallow grooves possibly caused in the process of manufacture. Its diameter on one side is about 5.5. cms. and on the other about 5.7 cms. The Malays describe it as a fairy-circlet (*gēlang jin*) and credit its wearer with the gift of invulnerability. A fragment of apparently a somewhat similar type of ornament has been found at Nyik near Kuantan.²

Accompanied by the founder of the bracelet, I visited the spot where it was picked up. The impression made by it in the soil was

¹ Vide Graham's "Siam" 3rd edition Vol. I page 165 *et seq.*

² Vide Evans on "Stone built Graves in Perak" *l.c.s.*

still evident. Close by, I found small fragments of rough pottery, an iron implement (Plate xl fig. 7), a small fragment of the rim of a bronze vessel, the fragment of another bronze object decorated with wavy lines (Plate xxxvii fig. 7) possibly part of a plaque or of the flattened portion of a vessel.

In a runnel leading from the same spot down to the river I discovered six ancient iron implements (Plate xl fig. 2, 3, 4, 6, 8 and 12). The falcion-shaped object (fig. 2) is of a similar type to one of the implements found at Telok Lubok Puai which I have already described. The three chisel-like tools (figs. 3, 4, and 8) have rounded hafts and heads sharpened and hammered flat. The object (fig 6) is apparently a scraper. It may also have been used as a knife. Figure 7 is that of a knife. The small-socketed "pick-axe" (fig. 12), if straightened, would rather approximate, in appearance to that shown as fig. 5 on the same plate. Most of the implements described seem to have been miners' or metal-workers' tools.

The quoit-like object (shown on Plate xlii fig. 1) was also discovered at Bukit Jong. As the finder had died I was unable to ascertain in what circumstances it was obtained. It is of highly polished, light-greyish stone of which the grain is visible in parts. It is sharpened all around the edge. Both sides are rounded but the bevelling is more pronounced on one side. Its diameter is 14.4 cms., while the diameter of the inner circle is 6.7 cms. at one side and slightly less on the other. On the circumference of the inner circle are faint incised lines apparently caused in the process of manufacture. A similar object which has also come into my possession was picked up on the strand of the river at Pasir Kuang a short distance below Bukit Jong (Plate xxxviii fig. 10). This is of a greenish colour. The diameter of the object is 17.3 cms. and of its inner circle is 6.6 cms. Its outer edge is jagged while the inner edge is highly polished and has lost any traces, which may originally have been left in the process of the manufacture.

Quoit-like objects of stone of a similar type to those here described have been found in the wash-boxes at the Kemaboi Hydraulic Mine Negri Sembilan.¹

It is uncertain what these stone discs were used for. One theory is that they were religious symbols of some sort. Mr. Evans points out that the larger specimens are reminiscent of a certain type of club head from British Guinea. The jagged edges (caused by constant usage) of the specimen found at Pasir Kuang would go to support the view that it was a weapon.

Dato' Stia Jaya, late Malay Secretary to H. H. the Sultan of Pahang, informed me some years ago that aborigines were known to

¹ Evans "Ethnology and Archaeology of the Malay Peninsula" page 136 *et seq.*, pl. xxxvii.

wear such objects, when, found, as a sort of buckle (or possibly a talisman) tied around their waist. The Hon'ble Mr. A. F. Worthington who has seen the discs considers that they may have formed the prototype of a certain common type of jade ornament.¹

The people then whose traces were found at Bukit Jong wore stone ornaments used bronze utensils comparatively highly finished, and iron implements crudely wrought. The indications are that they were early Iron Age settlers who had not yet discarded attractive kinds of stone for special uses, and who were skilled in the working of bronze but were novices in the working of iron.

Other objects found in the Tembeling are two solid stone roundels. One was picked up at Jeram Aur. It has a diameter on one side of 6.4 cms, and on the other, 6.9 cms. Its thickness varies from about 1.4 cms. to 1.6 cms. The side with the larger diameter is more roughly finished than the other. The second disc (Plate xxxviii fig. 9) has a diameter of 5.4 cms. on one side and 5.7 cms. on the other. It was found at Pasir Merting. Its maximum thickness is about 1 cm. The edges of both discs bear ring markings. A stone disc of a type similar to those here mentioned has been found at Kuala Nyong.² It is possible that these objects were used as stoppers for receptacles of some sort.

The high-way of inland communication between Pahang and the more northerly countries in the Peninsula has always been the Tembeling. The "Siamese" in Pahang on their defeat by the Malays about the middle of the 15th century retreated up that river.³ The ruler of Ligor followed the same route⁴ after the repulse of his invading forces about the end of the 15th century. This fact and the relics found at Jeram Kwi, Kuala Nyong, Teluk Lubok Puai and Bukit Jong which I have here described lead to the conclusion that in the past the valley of the Tembeling was much more extensively inhabited than it is at the present day.⁵

¹ *c.f.* the custom prevalent amongst women of the Mushso tribe in Siam of wearing large silver discs which are regarded as heir-looms and held very precious (Grahams "Siam" 3rd edition Vol. I p. 141).

² Malay Annals.

³ Malay Annals.

⁴ Evans "Further Notes on Stone Implements Associated with Pottery" *l.c.s.*



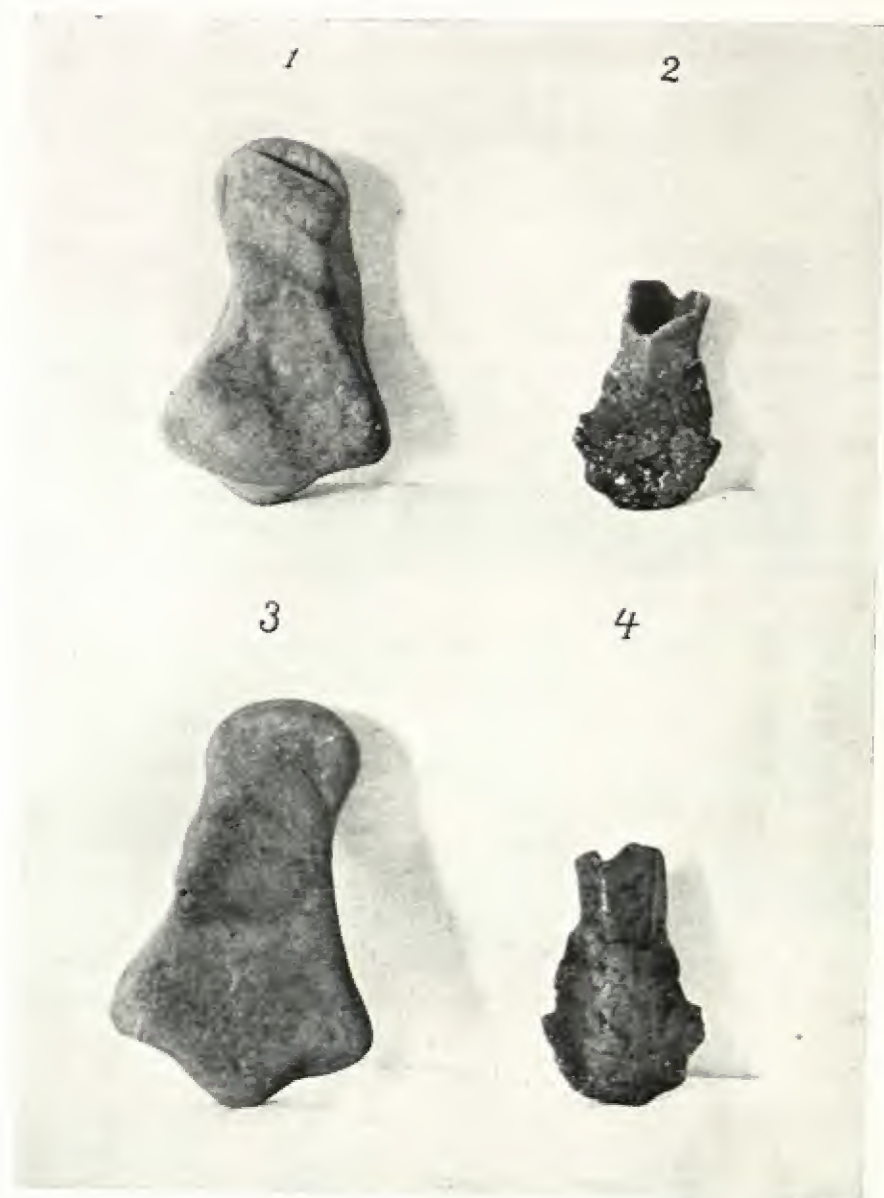
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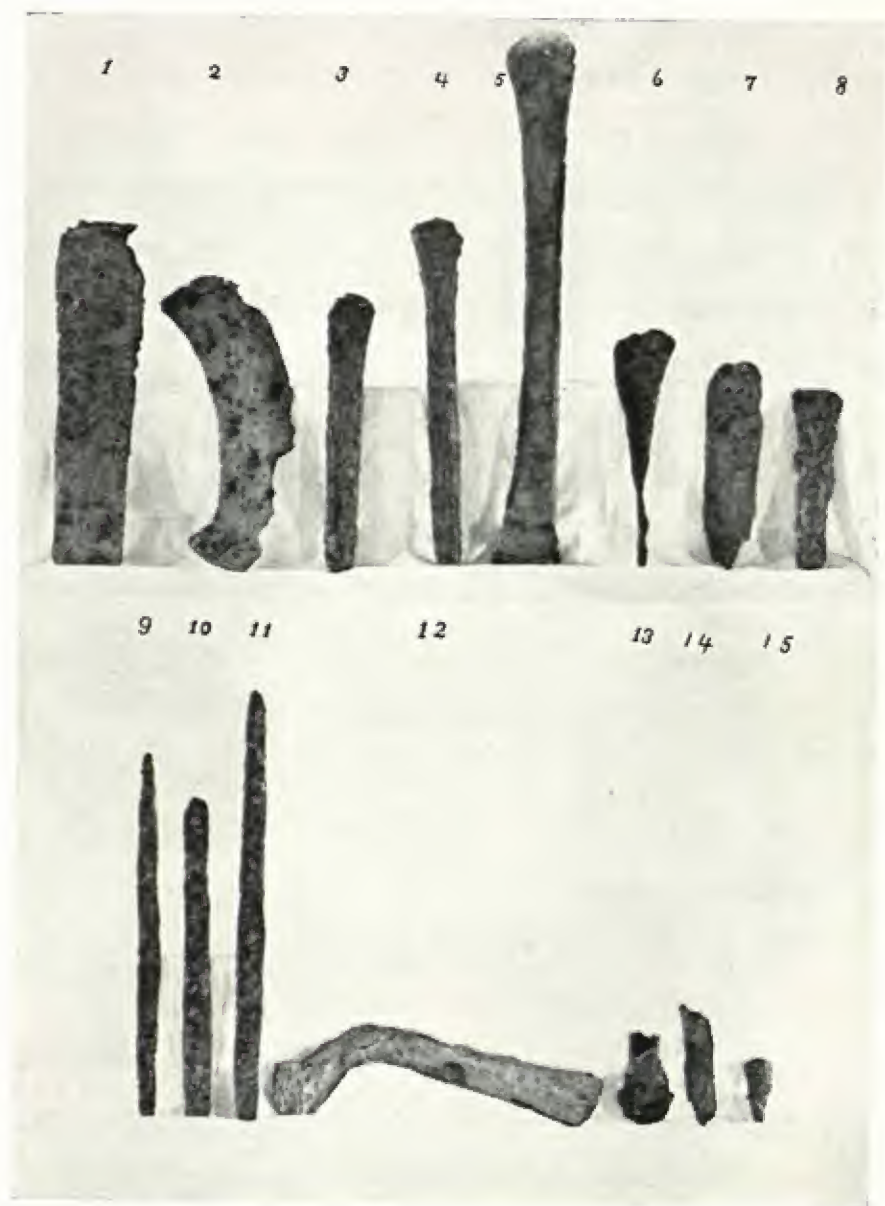
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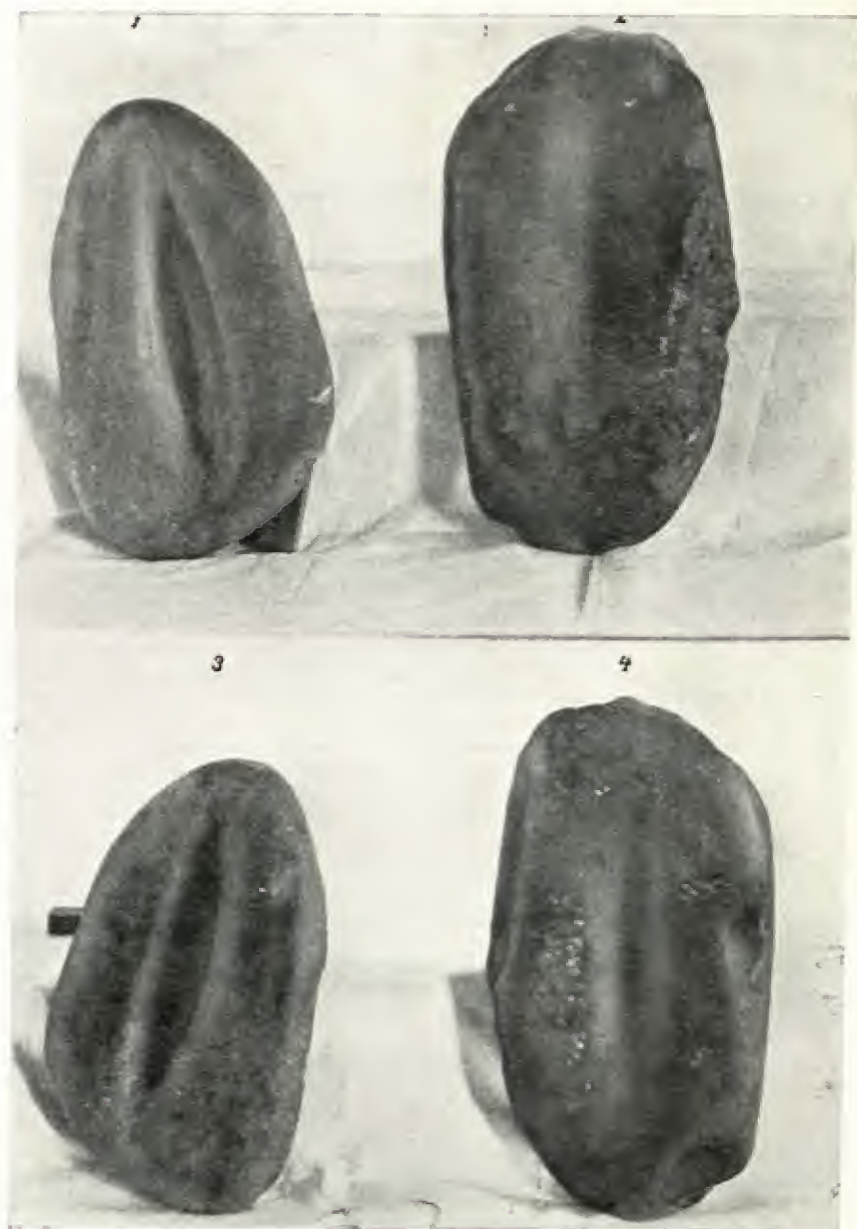
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LINEHAN: Discoveries on the Tembeling.

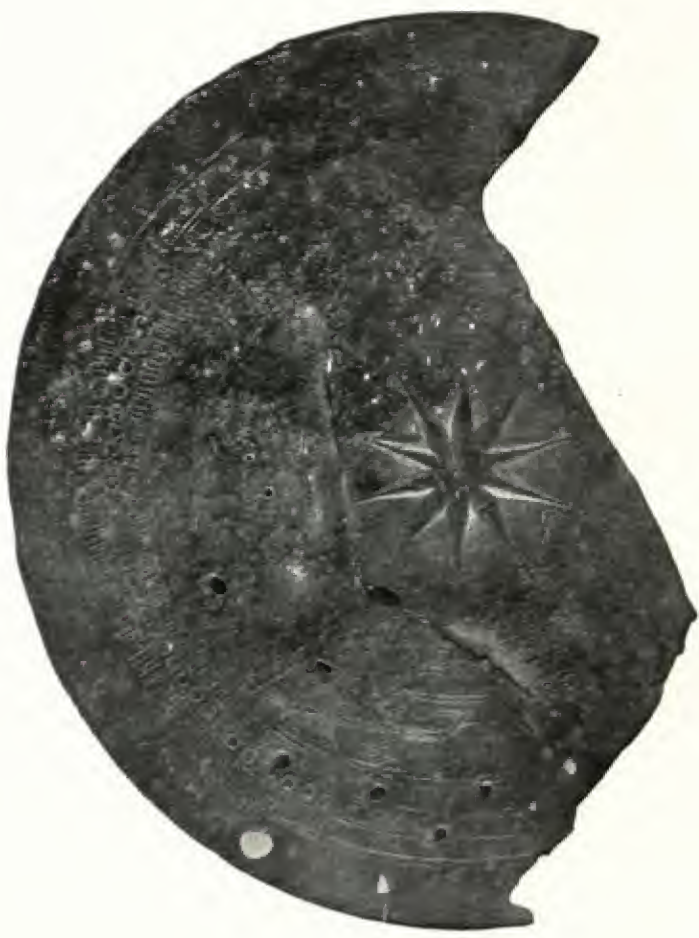


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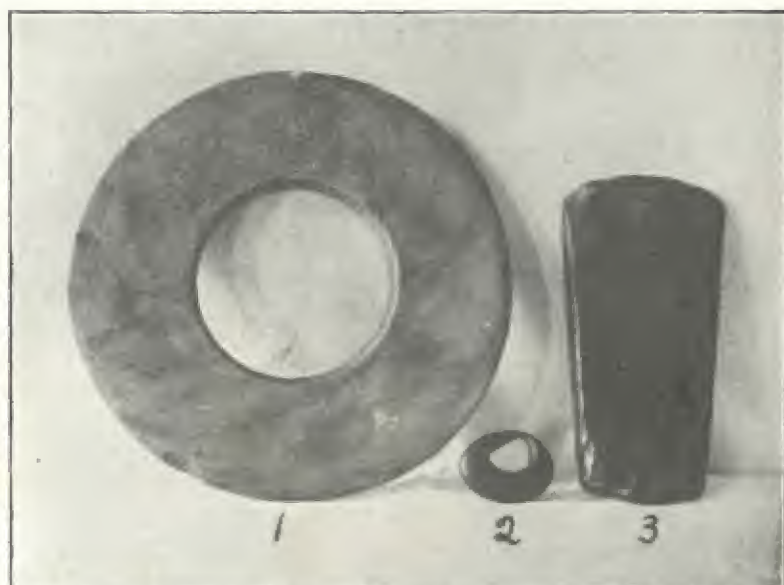
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LINEHAN: Discoveries on the Tembeling.





LINEHAN: Discoveries on the Tembeling.

Explanation of Plates.**Plate XXXVI.**

Clay objects found at Jeram Kwi. No. 1 is a mould of the breech part of a gun. Nos. 2 and 3 are probably crucibles. No. 4 is solid and may have been used as a mould of some sort. No. 5 may be part of the mould of a tube used for inserting powder into the vent of a gun. It has spiral markings in the outside and is partially hollow.

Plate XXXVII.

Clay gun-moulds found at Jeram Kwi. No. 1 gives another view of the mould shown as No. 1 on Plate xxxvi.

Plate XXXVIII.

Nos. 1, 2 and 3, stone celts from Kuala Nyong and Teluk Lubok Puai. No. 4 stone celt from Samas on the Tembeling. No. 5 stone bark-pounder from the Tanum near Kuala Merapoh. No. 6 upper part of bronze bowl from Bukit Jong. No. 7 part of bronze plaque or vessel from Bukit Jong. No. 8 polished flint implement of reddish-brown colour from Kuala Nyong. No. 9 stone disc from Pasir Merting on the Tembeling. No. 10 quoit-like object of greenish stone from Pasir Kuang near Bukit Jong. No. 11 stone bracelet from Bukit Jong.

Plate XXXIX.

Stone and iron implements. Nos. 1 and 3 implement of reddish grey stone from Kuala Nyong. Nos. 2 and 4 ancient iron tool with socket from remains of a brick building at *Tambak Siam*, Pekan District.

Plate XL.

Ancient iron implements. Nos. 1 and 5 were found at Teluk Lubok Puai. Nos. 2, 3, 4, 6, 7, 8 and 12 at Bukit Jong. These are described in the text. No. 9 was dug up in padi fields at Ulu Ayer Hitam, Pekan. Its length is 20.3 cm. It may have been a hafted spear-head. Nos. 10 and 11 were found on the banks of the river Merchong, Pekan District. Their use is unknown. No. 13 is shown also on Plate xxxix. No. 14 is a knife found at *Tambak Siam*, Pekan district. No. 15 was found on the site of an ancient brick structure at Pekan. It seems to be part of a spike or nail.

Plate XLI.

Open stone moulds for casting bronze or iron leaf-shaped spear-heads. Both obverse and reverse sides are shown.

Plate XLII.

Bronze "urn-lid" found near Teluk Lubok Puai.

Plate XLIII.

Fig. 1—Quoit-like object of light-greyish stone found at Bukit Jong, Sungei Tembeling.

Fig. 2—Stone finger-ring (?) found at Teluk Lubok Puai, Sungei Tembeling.

Fig. 3—Brownish-coloured stone implement picked up at Batu Pasir Garam near Teluk Lubok Puai, Sungei Tembeling.

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Notes on the remains of some ancient brick structures in Pekan district.

By W. LINEHAN.

(Plates XLIV—XLV).

While I was stationed in Pekan in 1925 the traces of four old buildings came to light. Of one (*Tambak Siam*) I have preserved a fairly full description. My notes on the others were unfortunately damaged in the big floods. Some of the specimens obtained are missing owing to the same cause.

Tambak Siam.

Tambak Siam where the first discovery was made was, as the name indicates, an artificial mound situated at Langgar on the left bank of the Pahang river on the Penghulu's land. The name, the tradition that the mound was of pre-Malay origin and the fact that a large unfinished canal called *Parit Siam* and a pool styled *Kotam Siam* (also reputedly pre-Malay) were near by, induced me to undertake excavations.

At a depth of about two feet, after the removal of quantities of loose bricks, the remains of a brick wall were discovered. Following this around we laid bare the walls of a quadrilateral brick structure (Plate xlv). What remained of the walls measured about $1\frac{1}{2}$ feet at its greatest height, with a breadth of about $1\frac{3}{8}$ feet. The walls were about 20 feet long on the northern side, the lengths of the southern, eastern and western sides being about 24 feet, 16 feet and 24 feet respectively. The smallest brick found measured $8\frac{3}{4}$ " by 4" by $2\frac{1}{2}$ " weighing $5\frac{1}{2}$ lbs. while the largest measured 12" by $8\frac{1}{4}$ " by $2\frac{1}{2}$ " and weighed 13 lbs. The greatest number of layers of bricks found was six. No material had been used to bind them together. The entrance to the building was at the northern corner facing in the direction of the river Pahang Tua.

After the walls had been laid bare the interior was excavated and the following articles were found at a depth of about two feet:—a tiny strip of copper, a small sea-shell, quantities of fossil damar, and numerous fragments of pottery (earthen-ware and porcelain). About half a foot lower down we came upon a quantity of baked clay interspersed with charcoal and gravel—evidently the fire place. At this level were found four gun-flints, a socketed iron tool (plate xl fig. 13), part of an iron knife or cutting implement (plate xl fig. 14), a human tooth, fragments of rough pottery and a small fire-hardened, grooved article. The iron tool with socket is an obsolete form of implement, (*tulang marwas*). It seems similar in shape to a bronze celt discovered in mines at Kenaboi, Negri Sembilan, a photograph of which is shown on page 155 of Dr. Winstedt's "Malaya."

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Sufficiently numerous fragments of a porcelain dish were found to enable me to identify it as being of a type similar to an early Ming piece described by Gulland in his book on Chinese Porcelain (Vol. I page 149, Illustration No. 223).

Kuala Chini.

The finding of unusually large bricks in the Chini river at Bintang near its junction with the Pahang (about 40 miles from Pekan) put me on the track of the next discovery.

On my way to the head waters of the Rompin overland *via* Lake Chini, I had the bank of the river Chini, near where the bricks were found, excavated. Digging revealed the foundations of a building of a similar type to that at *Tambak Siam*. The finds were few possibly owing to the fact that part of the foundations of the building had disappeared in the waters of the river, nor had I time to make a thorough investigation of the site. A few fragments of pottery, a glass bead, and some pieces of fossil damar were found. Near the site of the building is an old grave-yard in which a pair of uninscribed tomb-stones of Achehnese pattern were found. The stones are of a date probably not later than the end of the 17th century.¹

The local Malays informed me that when digging graves there, they frequently came across fragments of pottery some specimens of which they showed me—an indication that the site was occupied before the place came to be used as a grave-yard—perhaps by the same race that built the neighbouring brick structure.

Pekan.

Excavations were next undertaken on Che Ahmad's land in Pekan near the *padang*. Here while the line of the foundations was tolerably plain, nothing remained of the building. When the debris of the more modern structures on the same site had been cleared away a few fragments of rough pottery, small quantities of ruddle, part of an iron object (plate xl fig. 15) and four stone implements (*batu lintar*), one in an unfinished state, were found. The few bricks discovered were like those at *Tambak Siam* and *Kuala Chini*. The late Sultan Mahmud is said to have had excavations carried out on this site. It is not known what finds he made.

Pengkalen Durien.

The remains of the next building discovered were at Pengkalen Durien on the Bebar river about 30 miles from its mouth, near a place called *Padang Siam*. The locality is in the heart of the

¹ The Achehnese invasion of Pahang which took place in the early part of the 17th century had spent itself by about the end of the century.

jungle far from any Malay Village. The head-man of the local Jakun put me on the track of this discovery by pointing out a spot where he had found a stone implement (*batu lintar*). On excavation I came upon the site of a brick structure. Unlike those of the buildings at *Tambak Siam* and *Kuala Chini* the bricks had mostly crumbled into fragments. Owing to erosion of the river bank part of the site had disappeared in the river. The following objects were discovered at a depth of about a foot:—a small undamaged jar of Sawankalok ware (14th century) with greyish-green crackle glaze worn away at the base, some fragments of pottery including part of an eared earthen-ware vessel, a small fire-hardened grooved article of a substance like charcoal resembling that found at *Tambak Siam*, small quantities of ruddle, fossil damar, and the fragments of a larger iron cauldron.

The jar has a grey-green crackle glaze which is worn away at the base. It has a small purple splash at the mouth. When on leave in 1926 I took the opportunity of submitting it to Mr. Rackham, Keeper of the Department of Ceramics, Victoria and Albert Museum. He identified it as a product of potteries which existed at Sawan Kalok (to the north of Bangkok) in the 14th century.

The similarity in the type of bricks used, and the finding of the same type of article both at *Tambak Siam*, and *Pengkalen Durien* point to the view that the buildings at *Tambak Siam*, *Kuala Chini Pekan*, and *Pengkalen Durien* are of the same period. If we accept the gun-flints found at *Tambak Siam* as being contemporaneous with the original structure, and if we assume that flint-locks were introduced to the East from Europe, then the building cannot have been constructed before 1635 A.D. on which date flint-locks were first used in Europe. But the small bulk of the flints, their heaviness in comparison with their bulk, and their sharpness make it possible that these objects forced their way down to the floor of the building and that they are the relics not of the original occupiers but of more modern occupiers of the same site. It is recorded, for instance, in the *Journal of the Royal Society of Antiquaries of Ireland* (Vol. I, Pt. 3, Page 206) that a gun-flint was found in a lake-dwelling at the same depth as a flint arrow-head.

If we reject the evidence of the gun-flints as to age there is the find of Sawan Kalok pottery at *Pengkalen Durien* which indicates that the buildings could not have been built before the 14th century. Tradition has it that *Tambak Siam* is of pre-Malay origin. The Malays conquered Pahang about the middle of the 15th century (the first Malay ruler of Pahang died in 1475 A.D.). The date of the structures then may lie between the 14th and the middle of the following century.

It is possible that the structures continued to be used after the Malay conquest of Pahang. The Siamese regime was upset but not all of that race were driven out of the country. Many of



LINEHANG Ancient Brick Structure in Pahang.





LINEHAN. Artificially Worked Stone from Pahang.



them must have remained and ultimately become absorbed by the Malays. The *Hikayat Hang Tuah* written in the 16th century records that the people of Pahang spoke a mixed language.² Then there are seeming anomalies in the nomenclature of places, e.g. *Kampung Melayu* near Kuala Chini, which can only be explained on the assumption that side by side with the Malays there formerly existed another race on the banks of the river Pahang the inhabitants of which at the present day are solely Malay.

The structures may have been used as small shrines or were possibly the habitations of Buddhist hermits.

Other relics in my possession which may have originated with the race that constructed these buildings are: an iron tool or weapon dug up in padi fields at Ulu Ayer Hitam, Pekan District (Pl. xl fig. 9), two iron implements found on the banks of the Merchong river (Pl. xl figs. 10 and 11), a brownish-grey crackle jar with whitish body also found on the Merchong possibly a product of the Sawan Kalok factories, and an artificially worked stone (Plate xlv) in the river Ngudu to the west of Lake Chini which may have been a Buddhist votive tablet.

² Yet by the beginning of the 19th century all traces of the admixture had disappeared. Abdullah in his *Pelayeran* comments upon the elegance and purity of the language spoken by the Malays of Pahang.

The Royal Batavian Society of Arts and Letters.

The "Koninklijk Bataviaasch Genootschap van Kunsten en Wetenschappen" celebrated the 150th anniversary of its foundation in April of the present year at Batavia. This Society, founded in 1778, is the senior by six years of all the European Societies in Asia, the Asiatic Society (now the Asiatic Society of Bengal) having been founded next by Sir William Jones in 1784. The connection between British Malaya and the Royal Batavian Society is intimate as Sir (then Mr.) Stamford Raffles was a President of the Batavian Society during his residence in Java and on his departure he was presented with an address in which laudatory reference is made to "the period while you presided over the Society which you have recalled to a new existence."

This connection has been recently strengthened by the appointment of two members of the Malayan Society, Mr. C. O. Blagden, M.A., D.LITT., and Mr. R. O. Winstedt, C.M.G., M.A., D.LITT., to Honorary Membership of the Royal Batavian Society.

The Malayan Branch of the Royal Asiatic Society having received an invitation to send a delegate to the celebrations the President and Council appointed Captain A. C. Baker, M.C. as a representative to convey the greetings of the Malayan Society, to express its hopes that the Royal Batavian Society might long continue to maintain the eminent position in the world of science and letters which its distinguished history had won for it, and to avail itself of the opportunity of renewing long-established ties of friendship.

At the principal meeting of the celebrations, at which His Excellency the Governor General of Netherlands India and over thirty delegates representing learned societies and institutions of Europe and Asia congratulated the Royal Batavian Society on its long and successful career, Captain Baker read a complimentary address from Sir Hayes Marriot, K.B.E., C.M.G., the President of the Malayan Branch of the Royal Asiatic Society, and afterwards took part in the excursions, including visits to Borobodur and Pranbanam, which the Royal Batavian Society had arranged for the entertainment of its foreign guests.

As representing His Excellency Sir Hugh Clifford, G.C.M.G., G.B.E., M.C.S., Governor of the Straits Settlements and High Commissioner for the Malay States, British Agent for Sarawak and British North Borneo, there also attended the sesquicentenary Mr. C. Boden Kloss, Director of Museums, Straits Settlements and Federated Malay States, who, following His Excellency the Governor General, read and presented to the President an address of congratulation and friendship from Sir Hugh Clifford and the Scientific Departments of the Governments of British Malaya.

The presence of delegates from British Malaya appears to have been much appreciated by the Royal Batavian Society; and the delegates themselves are deeply sensible of, and will always remember, the hospitality and entertainment they received. C. B. K.

The Bulletin of the Raffles Museum.

In future Malaysian Zoology is likely to occupy a smaller space in the Journal of the Malayan Branch of the Royal Society than has been the case in the past. Since 1905 the Federated Malay States Museums have published their own Journal, now in its fourteenth volume; and in 1911 the Sarawak Museum Journal made its appearance and three volumes have been issued to date. A third local Journal has now been established, the "Bulletin of the Raffles Museum, Straits Settlements."

These departmental Journals deal with many subjects for which formerly the Journal of the Malayan (*ex* Straits) Branch, Royal Asiatic Society, gave the only local opportunity for publication. They contained, and will contain, articles on the peoples of Malaysia, their anthropology, ethnology, customs, folklore, language, etc.; on antiquities and prehistory, zoology, botany and geology.

Reports dealing with the activities of the three Museum departments have from time to time appeared in the Journals of this Society; but the Raffles Museum has perhaps been more than the others a debtor to the Society for the hospitality of its pages in that it has hitherto possessed no publication of its own. This lack has now been remedied and the Museum's "Bulletin" will henceforth absorb the greater part of the Museum's records.

The "Bulletin of the Raffles Museum" can be obtained from the Raffles Museum, Singapore. The first Number consists of a report on the Blattidae of the Mentawi Islands ("*Spolia Mentawiensia*") by Dr. R. Hanitsch, formerly Director, Raffles Museum and Library, and for many years Honorary Treasurer of the Straits Branch, Royal Asiatic Society. C. Boden Kloss.

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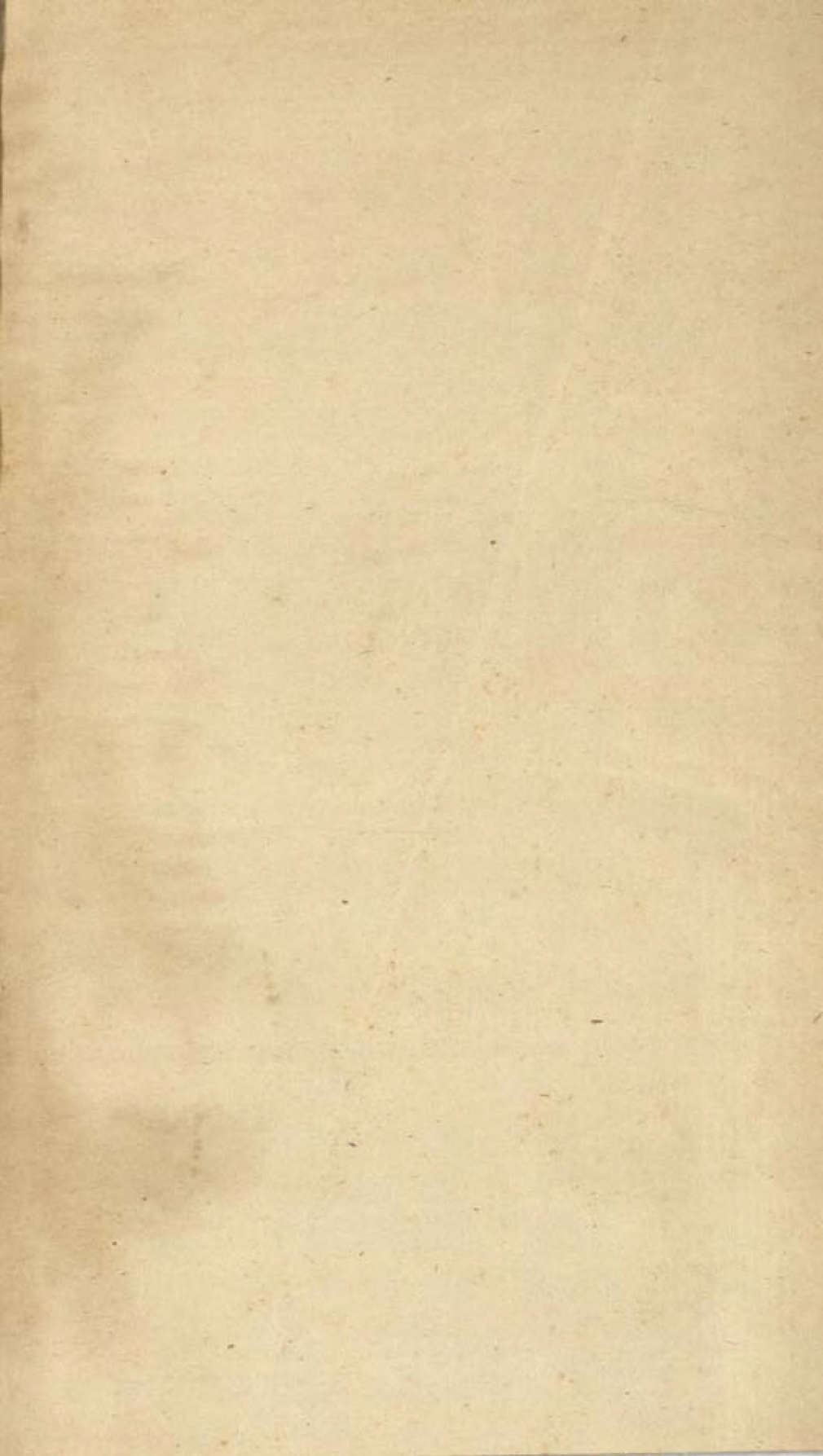
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